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STRATEGIC DEFENSE INITIATIVE (SDI)
SYSTEM ARCHITECTURE AND
KEY TRADEOFF STUDIES

PHASE IIC

IDEF₀ FUNCTIONAL DECOMPOSITION FLOWS
APPENDIX D

15 MARCH 1988
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KEY TRADEOFF STUDIES

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IDEF₀ FUNCTIONAL DECOMPOSITION FLOWS
APPENDIX D

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FOREWORD

The Satellite and Space Electronics Division (S&SED) of Rockwell International is pleased to submit this Final Report for Phase IIC of the Strategic Defense Initiative (SDI) System Architecture and Key Tradeoff Studies, in fulfillment of the requirements, as defined in the directed teaming arrangements, of contract MDA903-85-C-0065.

This report presents the results of the Rockwell team's efforts on this contract. These efforts were a continuation of the System Architecture and Key Trade-Off Studies initiated in December 1984, which Rockwell has been a part of since its inception. Rockwell's objectives in these studies have been to refine analysis of previously developed architectures, and to develop and document new architectural variants. This effort resulted in the creation of technical data packages required to support the Defense Acquisition Board I decision and develop the agreed upon baseline architecture documented in the Baseline Concept Description document.

This report is submitted in one volume with eight appendices.

| | |
|------------|--------------------------------------------------|
| CDRL A009 | Final Report |
| Appendix A | Rockwell SDI ARchitecture Study Document Index |
| Appendix B | Operations Concept (CDRL B003) |
| Appendix C | Architecture Evaluation (CDRL B006) |
| Appendix D | IDEF ₀ Functional Decomposition Flows |
| Appendix E | Congestion Control Subsystem Software Algorithm |
| Appendix F | Automated Systems Engineering (EPOS) |
| Appendix G | AERIE System Concept |
| Appendix H | Manufacturing Assessment |

INTRODUCTION

This appendix contains Rockwell's functional decomposition of the Strategic Defense System (SDS). This document contains a detailed decomposition of the basic function "Provide Ballistic Missile Defense" down to a level of detail adequate to make functional allocations to any variation of the architecture described in the Baseline Concept Description (4 August 1987), and in sufficient detail to be used in any strategic, theater or coupled architecture. Of the five top-level Ballistic Missile Defense functions identified—F1, Develop SDS; F2, Produce SDS; F3, Deploy SDS; F4, Employ SDS; and F5, Decommission SDS—only F3 (Deploy SDS) and F4 (Employ SDS) are further decomposed. Because of the emphasis by SDIO on Function 4 (Employ SDS), it was decomposed in greater detail than F3 (Deploy SDS). The decomposition of functions is complete when either a hardware decision must be made, e.g., a functional description of a Cryo-cooler, or the function could be allocated independent of a hardware concept, e.g., Weapons Fire Control function sufficiently defined to allow it to be allocated to the SSTS, SBI-CV or BSTS. In addition to functional descriptions, this document contains a traceable breakout of requirements derived from specific functions as well as the inputs and outputs that make up the functional process. The ability to allocate the functions described in this document to the elements of any architectural concept was a conscious decision by Rockwell. A functional decomposition was desired that was adaptable to any hardware concept, not one that was forced to conform to an existing concept.

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ACRONYMS AND ABBREVIATION

| | |
|------------|--------------------------------------------------------|
| AATPE | Advance Acquisition, Tracking, and Pointing Experiment |
| ABL | Airborne Laser |
| ABM | Antiballistic Missile |
| ACM | Attitude Control Module |
| ACP | Airborne Command Post |
| ACS | Attitude Control System |
| Ada PDL | Ada Process Description Language |
| ADC | ANALOG to Digital Converter |
| ADI | Air Defense Initiative |
| ADIO | ADCOM Intelligence Officer |
| ADOC | Air Defense Operations Center |
| ADOP | Advanced Distributed On-Board Processor |
| ADPE | Automated Data Processing Equipment |
| AEM | Arsenal Exchange Module |
| AERIE | Aerial Intercept Element |
| AFB | Air Force Base |
| AFS | Air Force Station |
| AFSC | Air Force Systems Command |
| AFSPACECOM | Air Force Space Command |
| AFSTC | Air Force Science Technology Center |
| AI | Artificial Intelligence |
| AIAA | American Institute of Aeronautics and Astronautics |
| AJ | Antijam |

| | |
|----------|--------------------------------------------------|
| ALCC | Airborne Launch Control Center |
| ALCM | Air-Launched Cruise Missile |
| ALERTCON | Alert Condition |
| ALS | Advanced Launch System |
| AMOS | Air Force Maui Optical Tracking Station |
| ANMCC | Alternate National Military Command Center |
| AOA | Airborne Optical Adjunct |
| AOS | Airborne Optical System |
| AOSP | Advanced On-Board Signal Processor |
| APA | Antenna Point and Acquisition |
| APU | Auxiliary Power Unit |
| ARTS | Automated Remote Tracking Station |
| ASAT | Antisatellite |
| ASDP | Advanced Sensor Demonstration Program |
| ASM | Air to Surface Missile |
| ASW | Antisubmarine Warfare |
| ASWCCS | Antisubmarine Warfare Command and Control System |
| ASWOC | Antisubmarine Warfare Operations Center |
| ATOC | Air Traffic Control Center |
| A/VLSI | Advanced Very Large Scale Intergration |
| AW/AA | Attack Warning/Attack Assessment |
| AWACC | Airborne Warning and Control Center |
| AWACS | Airborne Warning and Control System |
| AWDS | Automated Weather Distribution System |
| AWPDS | Attack Warning Processing and Display System |

| | |
|-------------------|--------------------------------------------------------|
| BBL | Brassboard Level |
| BCD | Baseline Concept Definition |
| BeH ₂ | Beryllium Hydride |
| BER | Bit Error Rate |
| BIC | Bradskill Interceptor Concept |
| BIS | Bank of International Settlements |
| BM | Battle Manager |
| BM/C ³ | Battle Management/Command, Control, and Communications |
| BMD | Ballistic Missile Defense |
| BMDOC | Ballistic Missile Defense Operations Center |
| BMEWS | Ballistic Missile Early Warning System |
| BP | Boost Phase |
| BPA | Budget Plan Authority |
| B/PBTBM | Boost/Post Boost Tier Battle Manager |
| BQ | Beam Quality |
| BRDF | Bidirectional Reflectance Distribution Function |
| BSTS | Boost Surveillance and Tracking System |
| C ² | Command and Control |
| C ³ | Command, Control, and Communications |
| C ³ I | Command, Control, Communications and Intelligence |
| CC | Carbon-Carbon |
| CDR | Critical Design Review |
| CDRL | Contract Data Requirements List |
| CELV | Complementary Expendable Launch Vehicle |
| CEP | Circular Error Probability |

| | |
|-----------------|------------------------------------------|
| CER | Cost Estimating Relationship |
| CETD | Concept Experiment Test and Development |
| CHOP | Change in Operational Procedures |
| CINC | Commander-in-Chief |
| CINCSD | Commander-in-Chief Strategic Defense |
| CINCSpace | Commander-in-Chief U.S. Space Command |
| CJCS | Commander Joint Chiefs of Staff |
| ClF5 | Chlorine Pentafluoride |
| CM | Countermeasure |
| CMBA | Cheyenne Mountain Complex |
| CMEA | Council for Mutual Economics Assistance |
| CMOS | Complementary Metal Oxide Semiconductor |
| CO ₂ | Carbon Dioxide |
| COBRA DANE | Shemya, AK Tracking Radar System |
| COMSAT | Communication Satellite |
| COMSEC | Communication Security |
| CONSU | Continental Soviet Union |
| CORA | Coherent Optical Radar Amplifier Program |
| CP | Command Post |
| CPC | Coherent Power Combiner |
| CPI | Consumer Price Index |
| CPSU | Communist Party of the Soviet Union |
| CSOC | Consolidated Space Operations Center |
| CSO | Closely Spaced Objects |
| CV | Carrier Vehicle |
| CW | Continuous Wave |

| | |
|---------|---------------------------------------------------|
| DAA | Direct Ascent ASAT |
| DAB | Defense Acquisition Board |
| DABM | Defense Against Ballistic Missiles |
| DANA | Direct Ascent Nuclear ASAT |
| DANNKA | Direct Ascent Nonuclear Kill ASAT |
| DARPA | Defense Advanced Research Project Agency |
| DASAT | Direct-Ascent Antisatellites |
| DD&T | Design, Development, and Test |
| DE | Damage Expectancy |
| DEFOON | Defense Condition (JCS) |
| Dem/Val | Demonstration/Validation |
| DEW | Directed Energy Weapon |
| DEW | Distant Early Warning |
| DF | Deuterium Fluoride |
| DIA | Defense Intelligence Agency |
| DIDS | Dynamic Interdiction Discrimination System |
| DMP | Defense Machinery Production |
| DMS | Data Management System |
| DMSPT | Defense Meteorological Satellite Program (METSAT) |
| DOD | Department of Defense |
| DSAT | Defense Satellite |
| DSCS | Defense Satellite Communications System |
| DSP | Defense Support Program |
| DST | Defense Suppression Threat |
| DT&E | Development, Test and Evaluation |

| | |
|-------|------------------------------------------------------------|
| DT&V | Development, Test, and Validation |
| DYSC | Dynamic Spherical Coordinate |
| EAM | Emergency Action Message |
| ECC | Emergency Command Cell |
| ECCM | Electronic Counter-Countermeasures |
| ECL | Emitter Coupled Logic |
| ECM | Electronic Countermeasure |
| ECMC | Enhanced Crisis Management Capability |
| ECS | Environmental Control System |
| EDAC | Error Detection and Correction |
| EKF | Extended Kalman Filter |
| EM | Electromagnetic |
| EMC | Electromagnetic Compatibility |
| EMI | Electromagnetic Interface |
| EML | Electromagnetic Launcher |
| EMP | Electromagnetic Pulse |
| EMRLD | Excimer Moderate Power Raman-Shifted Laser Device |
| EMSSP | Electromagnetic Standards and Specification Program |
| ENDO | Endoatmosphere |
| EOCM | Electro-Optic Countermeasure |
| EPOS | Engineering and Project Management Oriented Support System |
| EPS | Electric Power System |
| ERCS | Emergency Rocket Communication System |
| ERINT | Emergency Rocket Interceptor |
| ERIS | Exoatmospheric Reentry Interceptor Subsystem or System |

| | |
|----------|----------------------------------------------|
| ETEEM | End-To-End Engineering Model |
| EW | Electronic Warfare |
| EWB | Early Warning Radar |
| FBB | Fast Burn Booster |
| F/C | Fire Control |
| FCDL | Fire Control Data Link |
| FDA | Final Documentation and Analysis |
| FEL | Free Electron Laser |
| FLAGE | Flexible Lightweight Agile Guided Experiment |
| FO | Follow-On |
| FOB | Fractional Orbital Bombardment System |
| FOC | Full Operational Capability |
| FOG | Fiber Optics Gyro |
| FOR | Field of Regard |
| FORCECOM | U.S. Force Command |
| FOT&E | Follow-On Operational Tests and Evaluation |
| FOV | Field of View |
| FPA | Focal Plane Array |
| FSD | Full Scale Development |
| FSDE | Full Scale Engineering Development |
| FT | Fault Tolerance |
| FTD | Foreign Technology Division |
| FY | Fiscal Year |
| FYP | Five Year Plan (Soviet) |

| | |
|--------|-------------------------------------------------------------|
| G&C | Guidance & Control |
| G/AIRT | Ground/Air Interface Terminal |
| GATT | General Agreement on Trade and Tariff |
| GBL | Ground-Based Laser |
| GBLRS | Ground-Based Laser Repeater Station |
| GBLU | Ground-Based Laser Uplink |
| GBOS | Ground-Based Optical System |
| GBPS | Giga Bits Per Second |
| GBPST | Ground-Based Passive Signal Tracking |
| GBR | Ground-Based Radar |
| GDR | German Democratic Republic |
| GEO | Geosynchronous Orbit |
| GEODSS | Ground-Based Electro-Optical Deep Space Surveillance System |
| GHz | Gigahertz |
| GLCM | Ground-Launched Cruise Missile |
| GLOW | Gross Liftoff Weight |
| GMCP | Ground Mobile Command Post |
| GNP | Gross National Product |
| GOPS | Giga (billion) Operations Per Second |
| GPPS | Giga Pluses per Second |
| GPS | Global Positioning System |
| GSE | Ground Support Equipment |
| GSTS | Ground Surveillance and Tracking System |
| GVSC | Generic VHSIC Spaceborne Computer |
| GW | Gigawatts |
| GaAs | Gallium Arsenide |

| | |
|--------|------------------------------------------------|
| HA | Higher Authority |
| HW | Hardware |
| HEDI | High Endoatmospheric Defense Interceptor |
| HEDS | High Endoatmospheric Defense System |
| HEMT | High Electron Mobility Transistor |
| HF | Hydrogen Fluoride |
| HIBREL | High Brightness Relay |
| HICAMP | Highly Calibrated Airborne Measurement Program |
| HIP Be | Hot-Isostatic Press Beryllium |
| HLG | Hemispherical Laser Gyro |
| HLLV | Heavy Lift Launch Vehicle |
| HLV | Heavy Lift Vehicle |
| HOL | High Order Language |
| HSSU | High-Speed Search Unit |
| HTK | Hard Target Kill |
| HYVINT | Hyper-Velocity Interceptor |
| I&W | Indications and Warnings |
| IAW | In Accordance With |
| ICBM | Intercontinental Ballistic Missile |
| ICT | Intelligence Cycle Time |
| ID | Identification |
| IDHS | Intelligence Data Handling System |
| ILDC | Integrated Logic Design Concepts |
| IMF | International Monetary Fund |

| | |
|-------|-----------------------------------------------------------------------------------|
| IMU | Inertial Measurement Unit |
| INF | Intermediate Nuclear Forces |
| IOC | Initial Operating Capability |
| IPP | Impact Point Prediction |
| IR | Infrared |
| IR&D | Internal Research and Development |
| IRBM | Intermediate Range Ballistic Missile |
| ISP | Specific Impulse |
| ITUE | Integrated Test Uplinks Experiment |
| ITW&A | Integrated Tactical Warning and Assessment |
| IUS | Inertial Upper State |
| JCS | Joint Chiefs of Staff [also nuclear hardness level specification (i.e., JCS XXX)] |
| JSS | Joint Surveillance System |
| JSTPS | Joint Strategic Target Planning Staff |
| KA | Kill Assessment |
| KBPS | Kilo Bits Per Second |
| KED | Kill Enhancement Device |
| KEW | Kinetic Energy Weapon |
| kg | Kilogram |
| KKV | Kinetic Kill Vehicle |
| KREMS | Kiernam Re-Entry Measurement Site |
| KSC | Kennedy Space Center |
| KT | Kilo Ton |
| KV | Kill Vehicle |

| | |
|----------------|------------------------------------------|
| KW | Kilo Watts |
| LADAR | Laser Radar |
| LANTFLEET | Atlantic Fleet |
| LAU | Launch |
| LCC | Life Cycle Cost |
| LDC | Less-Developed Country |
| LDR | Leadership |
| LEO | Low Earth Orbit |
| LICD | Laser Imaging Component Development |
| LMF | Large Mirror Facility |
| LPARDS | Large Phase Array Radar Detection System |
| LPP | Launch Point Prediction |
| LRB | Liquid Rocket Booster |
| LRU | Line Replacement Unit |
| LUA | Launch-Under-Attack |
| LWIR | Long Wavelength Infrared |
| M ₁ | Basic Money Supply |
| MAC | Military Airlift Command |
| MANTECH | Manufacturing Technology |
| MaRV | Maneuvering Reentry Vehicle |
| MBMW | Machine Building and Metal Working |
| MBPS | Mega Bits per Second |
| MC | Midcourse Phase |
| MCC | Mission Control Center (Satellite) |

| | |
|---------|-------------------------------------------------------------------------|
| MCP | Mobile Command Post |
| MDP | Mission Data Processing |
| METSAT | Meteorological Satellite |
| MFC | Matched Filter Correlator |
| MILSTAR | Military Extremely High Frequency (EHF) Satellite Communications System |
| MIPS | Million Instructions Per Second |
| MIRV | Multiple Independently Targeted Reentry Vehicles |
| MIS | Missile |
| MLC | Mobile Liaison Cell |
| MMH | Monomethylhydrazine |
| MMW | Millimeter Wave |
| MOA | Memorandum Of Agreement |
| MOE | Measure of Effectiveness |
| MOM | Measure of Merit |
| MOPA | Master Oscillator Power Amplifier |
| MOPS | Million Operations Per Second |
| MOTR | Multiple Object Tracking Radar |
| MOU | Memorandum Of Understanding |
| MRP | Multiple Reentry Payload |
| MRPKKV | MRP Kinetic Kill Vehicle |
| MS | Milestone |
| MISC | Missile and Space Intelligence Center |
| MSLOC | Millions of Source Lines Of Code |
| MSSTM | Military Space System Technology Model |
| MUX | Multiplex |
| MW | Megawatts |

| | |
|-------------------------------|-----------------------------------------------|
| MWC | Missile Warning Center |
| MWDS | Missile Warning and Display System |
| MWIR | Mid-Wavelength Infrared |
| N ₂ H ₄ | Hydrazine |
| N ₂ O ₄ | Nitrogen Tetroxide |
| NASA | National Aeronautics and Space Administration |
| NASP | National Aerospace Plane |
| NATO | North Atlantic Treaty Organization |
| NAVSPASUR | Naval Space Surveillance System |
| NCA | National Command Authority |
| NCCS | Navy Command and Control System |
| NDEW | Nuclear Directed Energy Weapon |
| NDS | Nuclear Detection System (formerly IONDS) |
| NEACP | National Emergency Airborne Command Post |
| NEP | National Economic Plan |
| NIO | National Intelligence Officer |
| NKEW | Nuclear Kinetic Energy Weapon |
| NM | Network Manager |
| NMCC | National Military Command Center |
| NMCS | National Military Command System |
| NMP | Net Material Product |
| NOP | Nuclear Operations Plan (NATO) |
| NORAD | North American Aerospace Defense Command |
| NPB | Neutral Particle Beam |
| NPES | Nuclear Planning and Execution System |

| NTF/NTB | National Test Facility/National Test Bed |
|-----------|------------------------------------------|
| O&M | Operations & Maintenance |
| O&S | Operations and Support |
| OA | Oscillator Amplifier |
| OAI | Oscillator Amplifier Integration |
| OAMP | Optical Airborne Measurement Program |
| OB | Order of Battle |
| OBP/NM | On-Board Processor for Network Manager |
| OFVR | Out-of-Field-of-View Rejection |
| OIS | Orbit Insertion System |
| OMT | Other Military Targets |
| OMV | Orbital Maneuvering Vehicle |
| OSD | Office of the Secretary of Defense |
| OSIS | Ocean Surveillance Information System |
| OT&E | Operational Test and Evaluation |
| OTH | Over-The-Horizon |
| OTH-B | Over-the-Horizon Backscatter Radar |
| PACCS | Post-Attack Command Control System |
| PARCS | Perimeter Acquisition Radar System |
| PATHS | Precursor Above-The-Horizon Sensor |
| PAVE PAWS | SLBM Early Warning System |
| PAXBAR | Pacific Radar Barrier |
| PB | Post-Boost Phase |
| PBALL | Precision Ballistics |

| | |
|-----------|--------------------------------------------|
| PBV | Postboost Vehicle |
| PDR | Preliminary Design Review |
| PINS | Point In Space |
| PK | Probability of Kill |
| POS | Positioner Stage |
| PtSi | Platinum Silicon |
| PV-HgCdTe | Photovoltaic Mercury Cadmium Telluride |
| R^3 | Rotary Reciprocating Refrigerator |
| R&D | Research and Development |
| RAD | Radiation Absorbed Dose |
| RAM | Radar Absorption Material |
| RAM | Random Access Memory |
| RDT&E | Research Development Test and Evaluation |
| RECCE | Reconnaissance |
| REM | Radiation Equivalent Man |
| RF | Radio Frequency |
| RFW | Radar Frequency Weapon |
| RID | Range Insensitive Direction |
| RLG | Ring Laser Gyro |
| RMA | Reliability / Maintainability/Availability |
| ROCC | Regional Operations Control Center |
| ROE | Rule Of Engagement |
| ROFT | Rapid Optic Fabrication Technology |
| ROM | Read-Only Memory |
| RU | Rubles |

| | |
|-----------|-----------------------------------------------------------------------------|
| RV | Reentry Vehicle |
| RVF | RV Finder |
| RV FINDER | Reentry Vehicle Flash Identification and Discrimination Evaluation Research |
| S & SED | Satellite & Space Electronics Division, Rockwell International |
| SAC | Strategic Air Command |
| SACC | Sector Antisubmarine Control Center |
| SACDIN | Strategic Air Command Digital Information Network |
| SADMT | SDI Architecture Dataflow Modeling Technique |
| SALT | Strategic Arms Limitation Treaty |
| SAM | Surface-to-Air Missile |
| SAMTO | Space and Missile Test Organization |
| SATKA | Surveillance Acquisition, Tracking, and Kill Assessment |
| SBFEL | Space-Based Free-Electron Laser |
| SBI | Space-Based Interceptor |
| SBL | Space-Based Laser |
| SBSP | Space-Based Support Platform |
| SCF | Satellite Control Facility |
| SCIS | Survivable Communications Integration System |
| SCN | Space Communications Network |
| SCP | System Concept Paper |
| SDI | Strategic Defense Initiative |
| SDIO | Strategic Defense Initiative Organization |
| SDLV | Shuttle-Derived Launch Vehicle |
| SDR | System Design Review |
| SDS | Strategic Defense System |

| | |
|------------|------------------------------------------------------------------|
| SDS-CC | Strategic Defense System Command Center |
| SDS-OC | Strategic Defense System Operations Center |
| SECC | Survivable and Enduring Command Center (SAC) |
| SEER | Sensor Experimental Evaluation and Review |
| SEO | Survivability Enhancement Option |
| SEWS | Satellite Early Warning System |
| SHAPE | Supreme Headquarters Allied Power Europe (NATO) |
| SHF | Super High Frequency |
| SIE | SATKA Integrated Experiment |
| SIOP | Single Integrated Operational Plan |
| SIOP CINC | U&S Commander with Forces Committed to the SIOP |
| SIT | Spacecraft Integration and Test |
| SITREP | Situation Report |
| SLBM | Submarine Launched Ballistic Missile |
| SLC | Space Launch Complex |
| SLCM | Sea-Launched Cruise Missile |
| SLOC | Source Lines of Code |
| SMATH | Satellite Material Hardening (standardized) |
| SNF | Strategic Nuclear Forces |
| SOA | State Of Art |
| SOC | Satellite Operations Center/Sector Operations Center |
| SOCCC | Satellite Operations Center/Submarine Operational Control Center |
| SOF | Strategic Offensive Forces |
| SOSUS | Sound Surveillance System |
| SOVA | Soviet Analysis |
| SPACETRACK | AF Satellite Surveillance Network |

| | |
|----------|------------------------------------------------------------|
| SPADCCS | Space Defense Command and Control Center |
| SPADOC | Space Defense Operations Center |
| SPETSNAZ | Covert Soviet Special Forces |
| SPOC | Space Operations Center |
| SPR | Spares |
| SQM | Space-Qualified Model |
| SRAM | Short-Range Attack Missile |
| SRB | Solid Rocket Booster |
| SSBN | Ballistic Missile Nuclear-Energy Submarine |
| SSC | Space Surveillance Center |
| SSGN | Cruise Missile Nuclear-Energy Submarine |
| SSME | Space Shuttle Main Engine |
| SSN | Space Surveillance Network |
| SSP | Small Sortie Payload |
| SSP | Solid State Photomultiplier |
| SSTS | Space Surveillance & Tracking System |
| STAR | System Threat Assessment Report |
| STAS | Space Transportation Architecture Study |
| STP | Space Test Program |
| STR | Strategic Forces |
| STS | Space Transportation System |
| SU | Soviet Union |
| SURTASS | Surface Tower Array Surveillance System |
| SV | State Vector |
| SVEC | Surveillance, Vulnerability, Endurability and Connectivity |
| SW | Software |

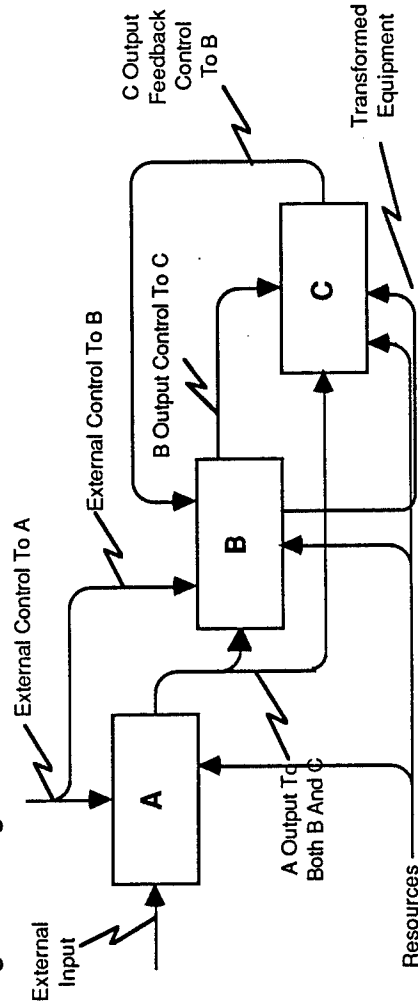
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|-------------|------------------------------------------|
| SWHCC | Static War Headquarters Command Center |
| SWIR | Short Wavelength Infrared |
| TAC | Tactical Air Command |
| TAV | Transatmospheric Vehicle |
| TBD | To Be Determined |
| TBM | Tactical Ballistic Missile |
| TBR | To Be Refined |
| TCN | Terrestrial-Based Communications Network |
| TDI | Time-Delay Integration |
| TDRSS | Tracking and Data Relay Satellite System |
| TEL | Transported Erector Launcher |
| TRU | Theoretical First Unit Costs |
| TIR | Terminal Imaging Radar |
| TMD | Theater Missile Defense |
| TOF | Time of Flight |
| TP | Terminal Phase |
| TPE | Tracking and Pointing Experiment |
| TRANSCOM | Transportation Command |
| TRANSIT | Navy Navigation Satellite |
| TT&C | Telemetry, Tracking, and Communications |
| TTI | Time-to-Impact |
| TW/AA | Threat Warning/Attack Assessment |
| TWT | Travelling Wave Tube |
| U&S Command | Unified and Specified Commands |

| | |
|------------|-----------------------------------------------|
| UCP | Unified Command Plan |
| UNAAF | Unified Action Armed Forces (JSC Pub 2) |
| USCINCEUR | U.S. Commander-in-Chief Europe |
| USCINCLANT | U.S. Commander-in-Chief Atlantic |
| USCINCPAC | U.S. Commander-in-Chief Pacific |
| USEURCOM | U.S. European Command |
| USLANTCOM | U.S. Atlantic Command |
| USPACOM | U.S. Pacific Command |
| USSOUTHCOM | U.S. South Command |
| USSPACECOM | U.S. Space Command |
| USSR | Union of Soviet Socialist Republic |
| U.S. | United States |
| UV | Ultraviolet |
| VAFB | Vandenberg Air Force Base |
| VHSIC | Very High-Speed Integrated Circuit |
| WBM | Weapon Battle Manager |
| WIS | WWMCCS Information System |
| WPI | Wholesale Price Index |
| WSI | War Support Industry |
| WWMCCS | Worldwide Military Command and Control System |
| XRL | X-Ray Laser |

SECTION I IDEFO FLOWS

INTRODUCTION TO SECTION I

Rockwell selected Integrated Computer Aided Manufacturing (ICAM) as a means to address the characteristics of the Baseline Concept Description (BCD) architecture. This particular methodology for representing the BCD architecture was selected because of its structured approach to modeling and its acceptance within the SDIO community. For those not familiar with IDEFo (ICAM Definition Zeroeth Order) functional modeling, the position at which the arrow enters a box conveys the specific role of the interface. System controls enter the top of the box, whereas the materials or information acted upon by the system operation enter the box from the left, resulting in the output of the operation, which leaves the right-hand side of the box. The mechanism which performs the operation enters the bottom of the box. The boxes and arrow meanings are used to relate several subfunctions on a diagram comprising a more general function.

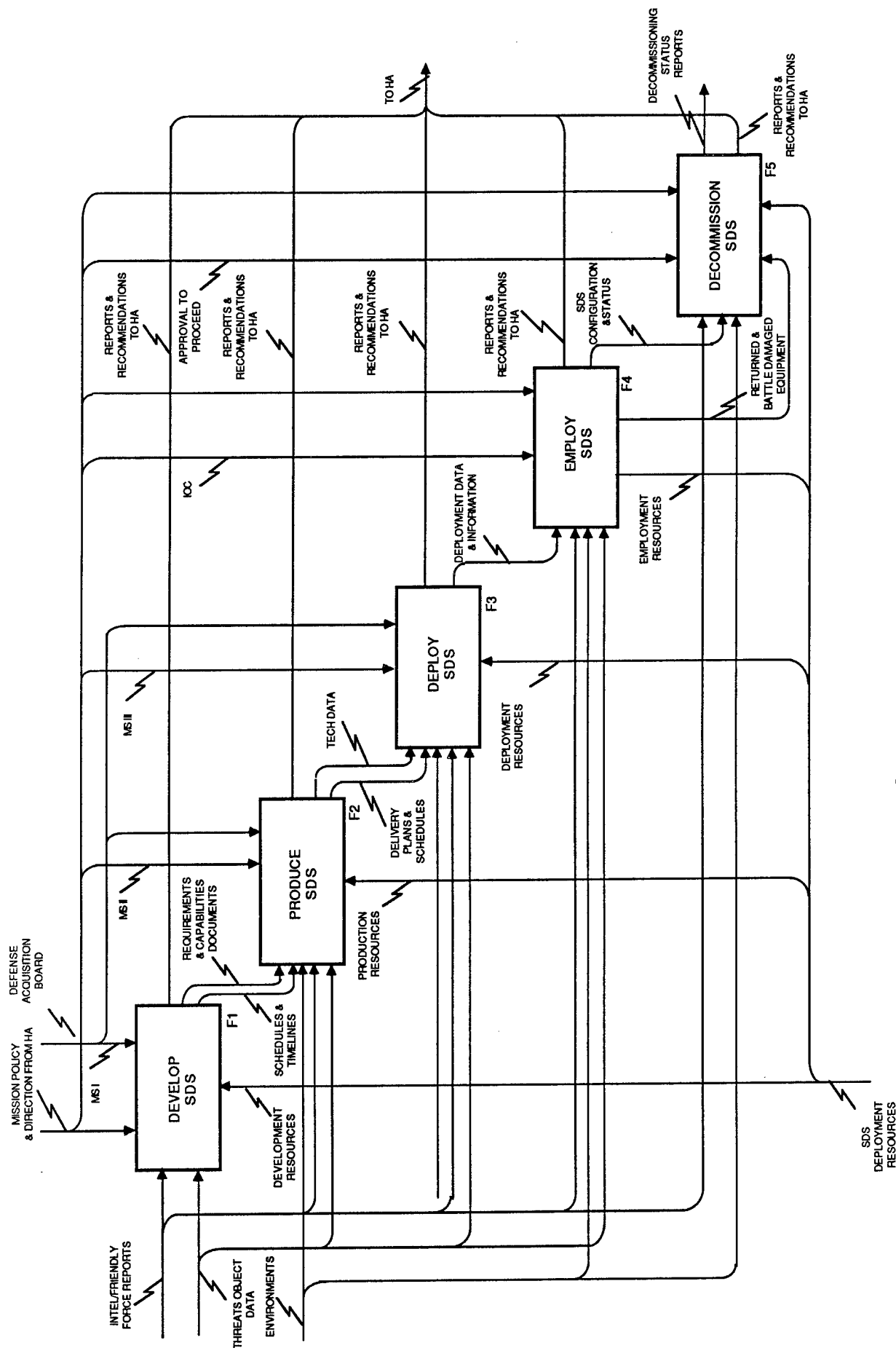


Box B output is a control for Box C, and output from Box C is a feedback control to Box B. Entering Box A is an external control (from the top) and an external input (from the left). Leaving (from the right) Box A is an output going to inputs to both Boxes B and C. Mechanism for A, B, and C enter (and leave) from the bottom.

IDEFo flows presented in this document are a structured functional representation of the Baseline Concept Description Architecture.

STRATEGIC DEFENSE SYSTEM

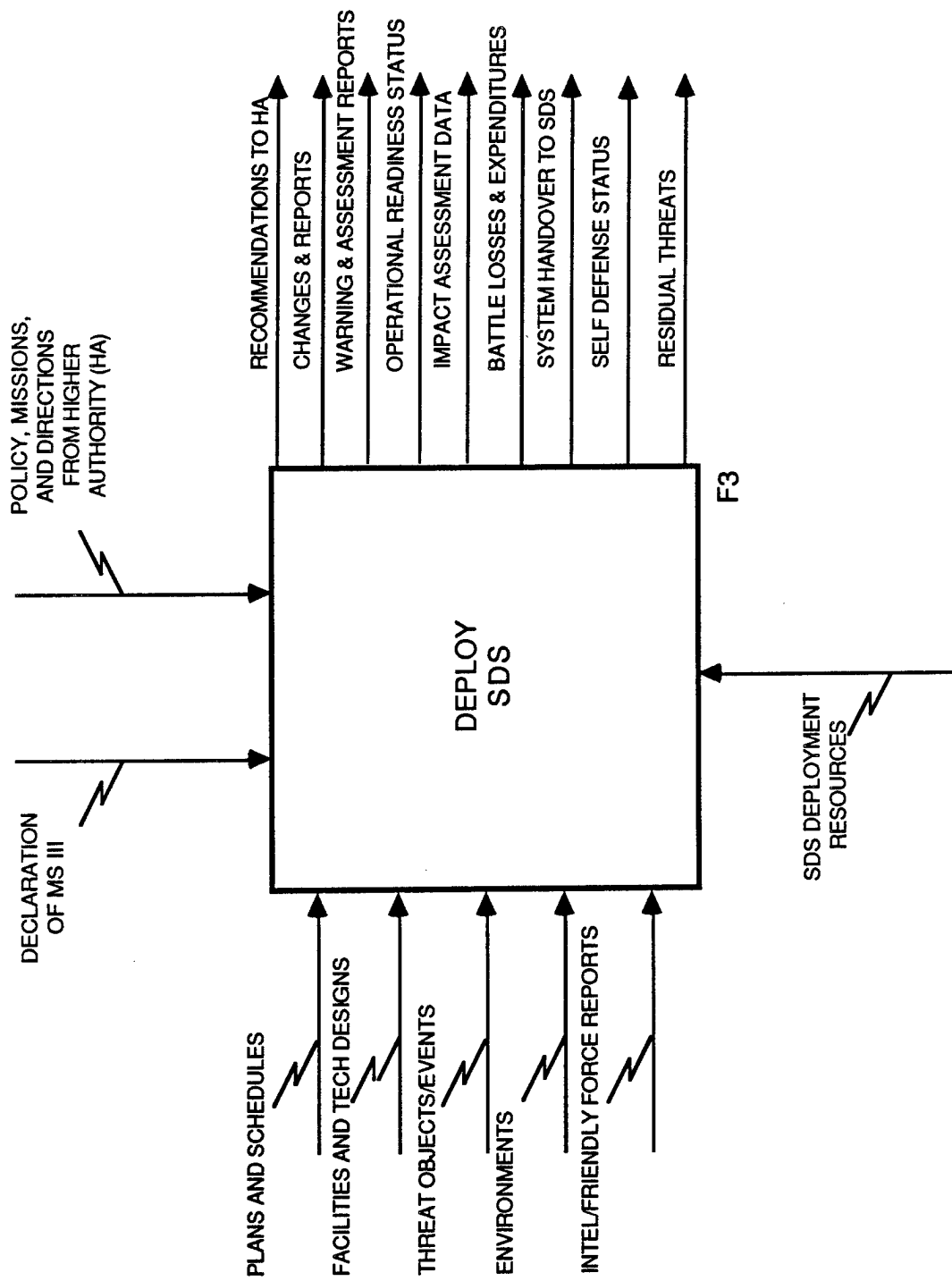
**IDEFo FLOWS
(THE STRATEGIC DEFENSE SYSTEM)**



NODE: F1 thru F5
TITLE: STRATEGIC DEFENSE SYSTEM

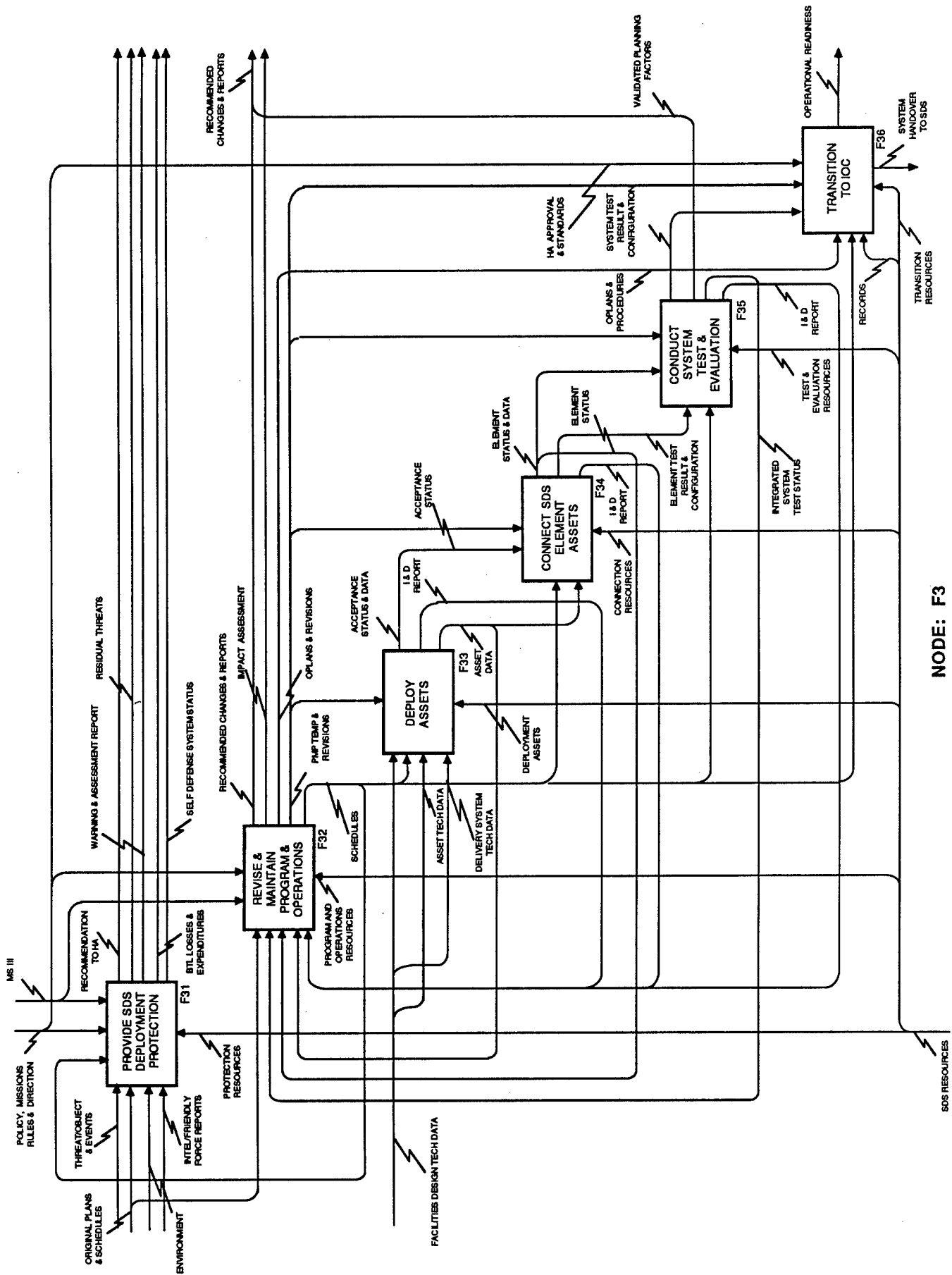
STRATEGIC DEFENSE SYSTEM

IDEFo FLOWS (DEPLOYMENT)

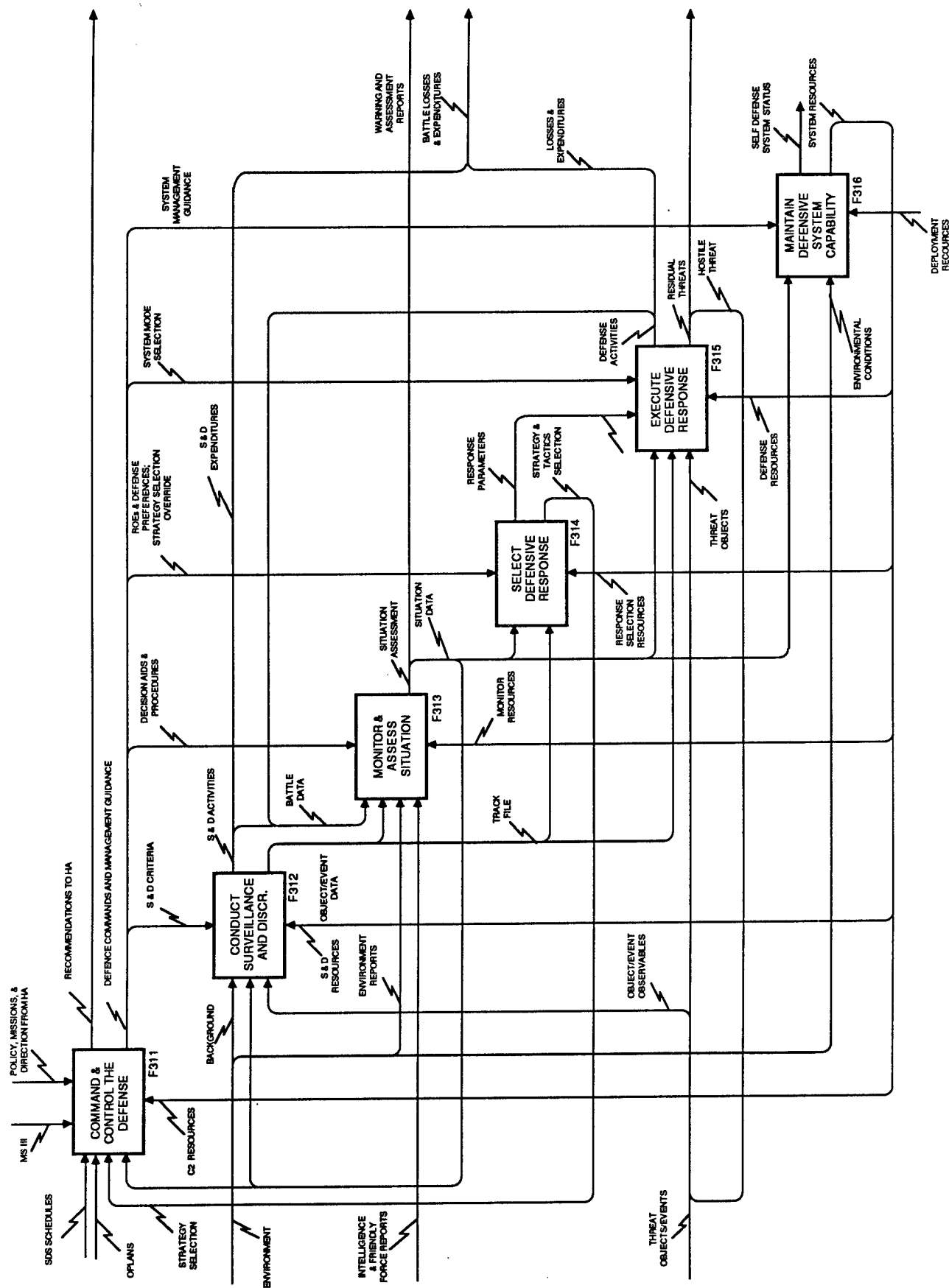


NODE: F3

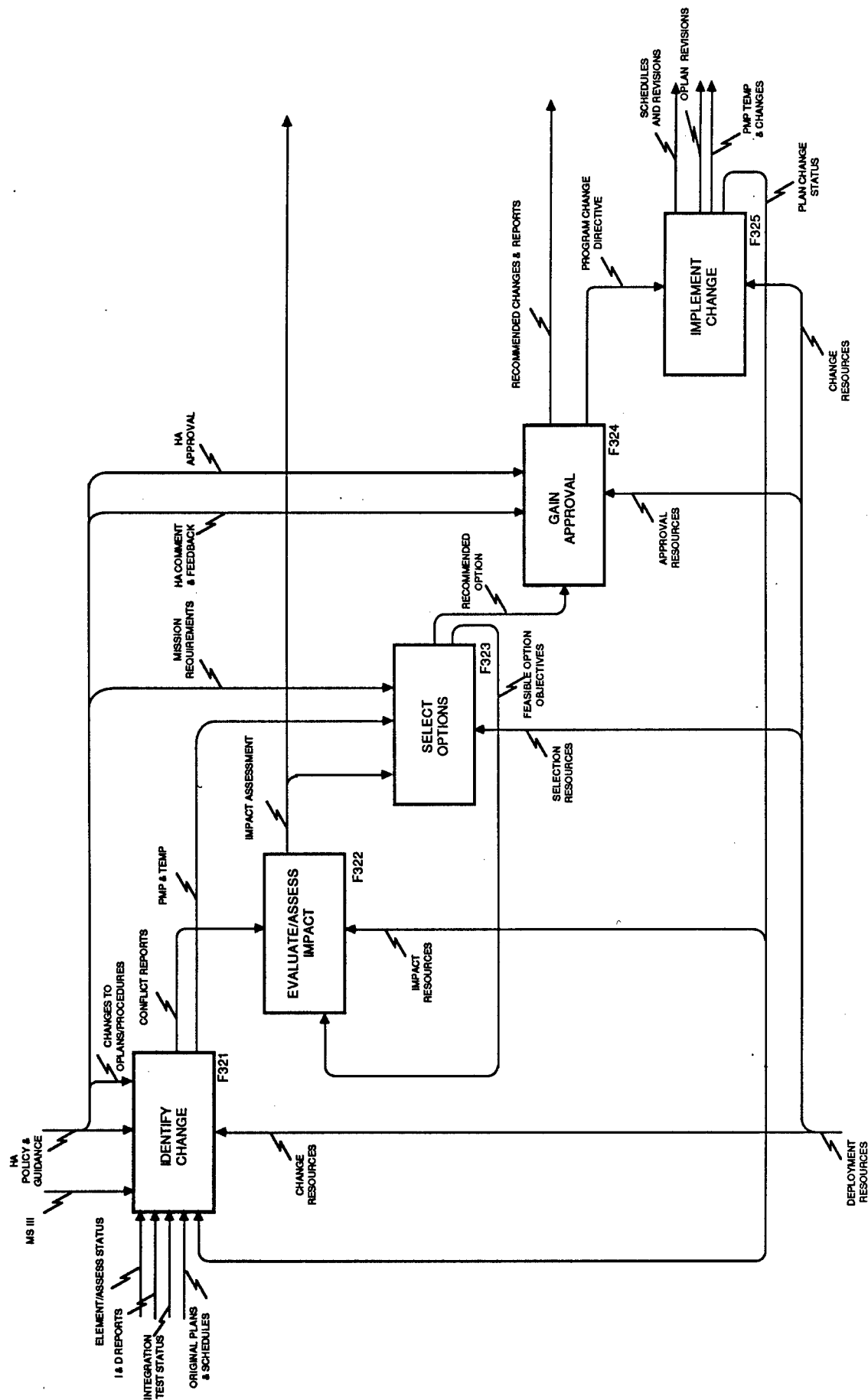
TITLE: I/O BOUNDARY OF "DEPLOY SDS"



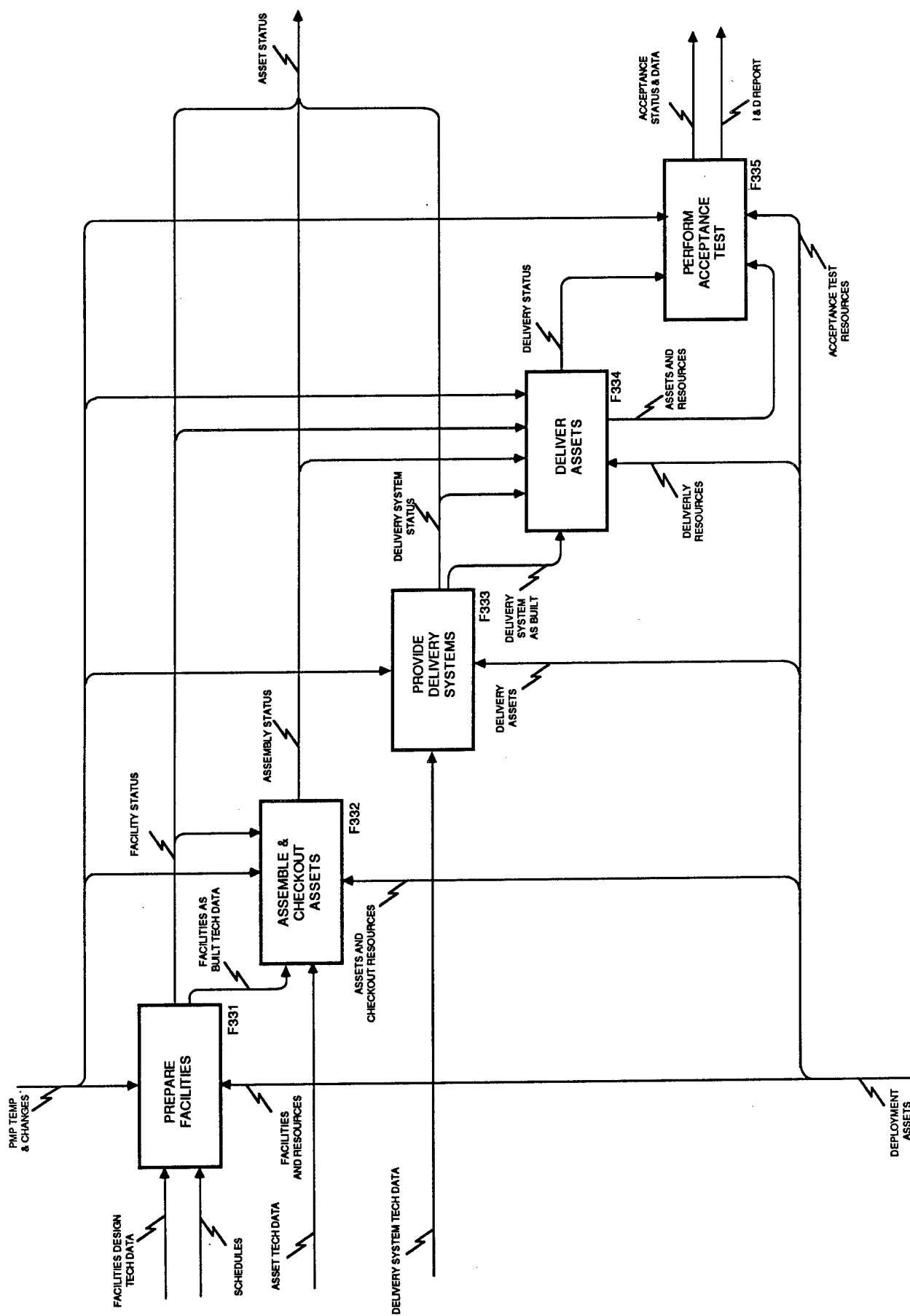
NODE: F3
TITLE: DEPLOY SDS



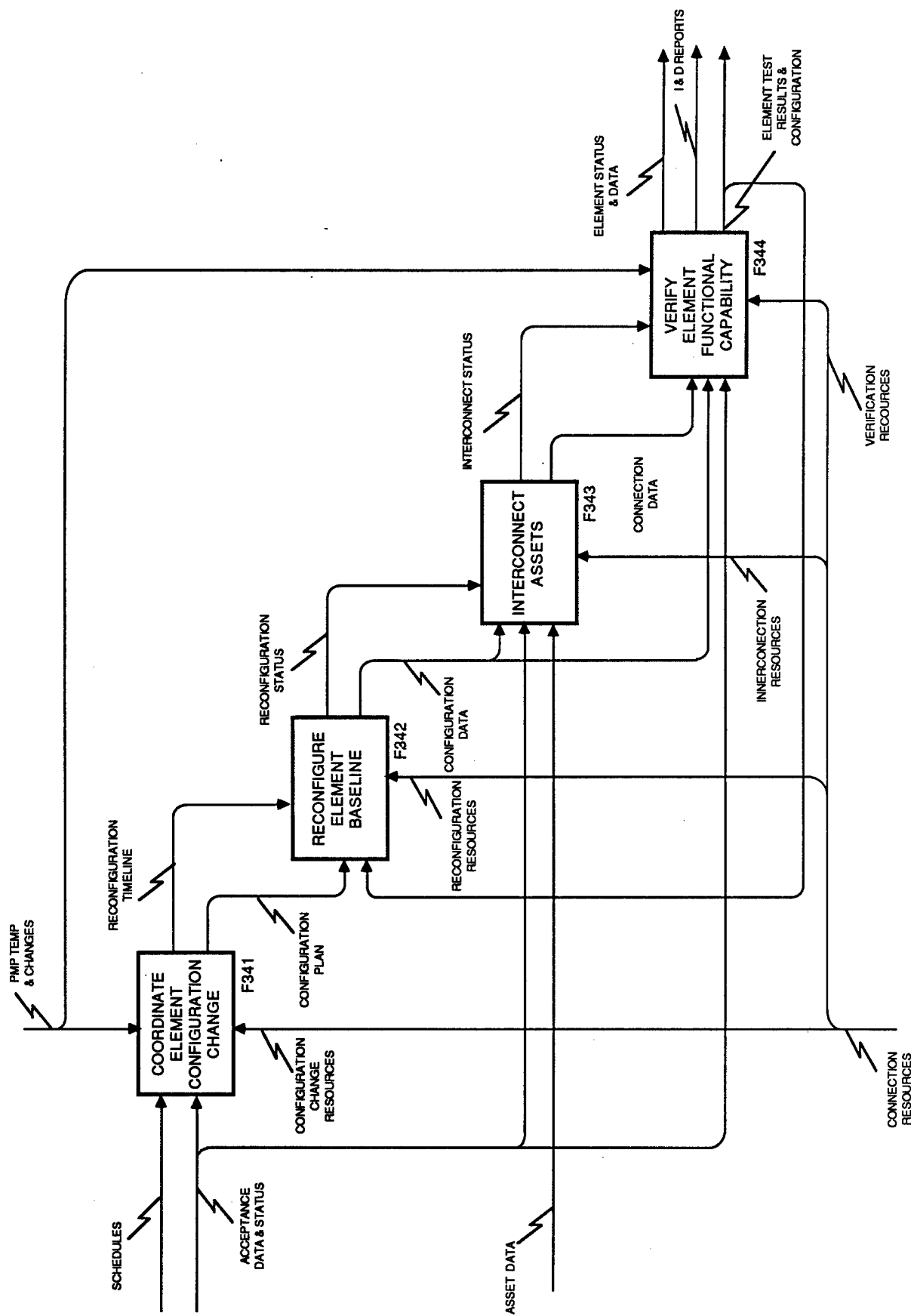
NODE: F31
TITLE: SDS DEPLOYMENT PROTECTION



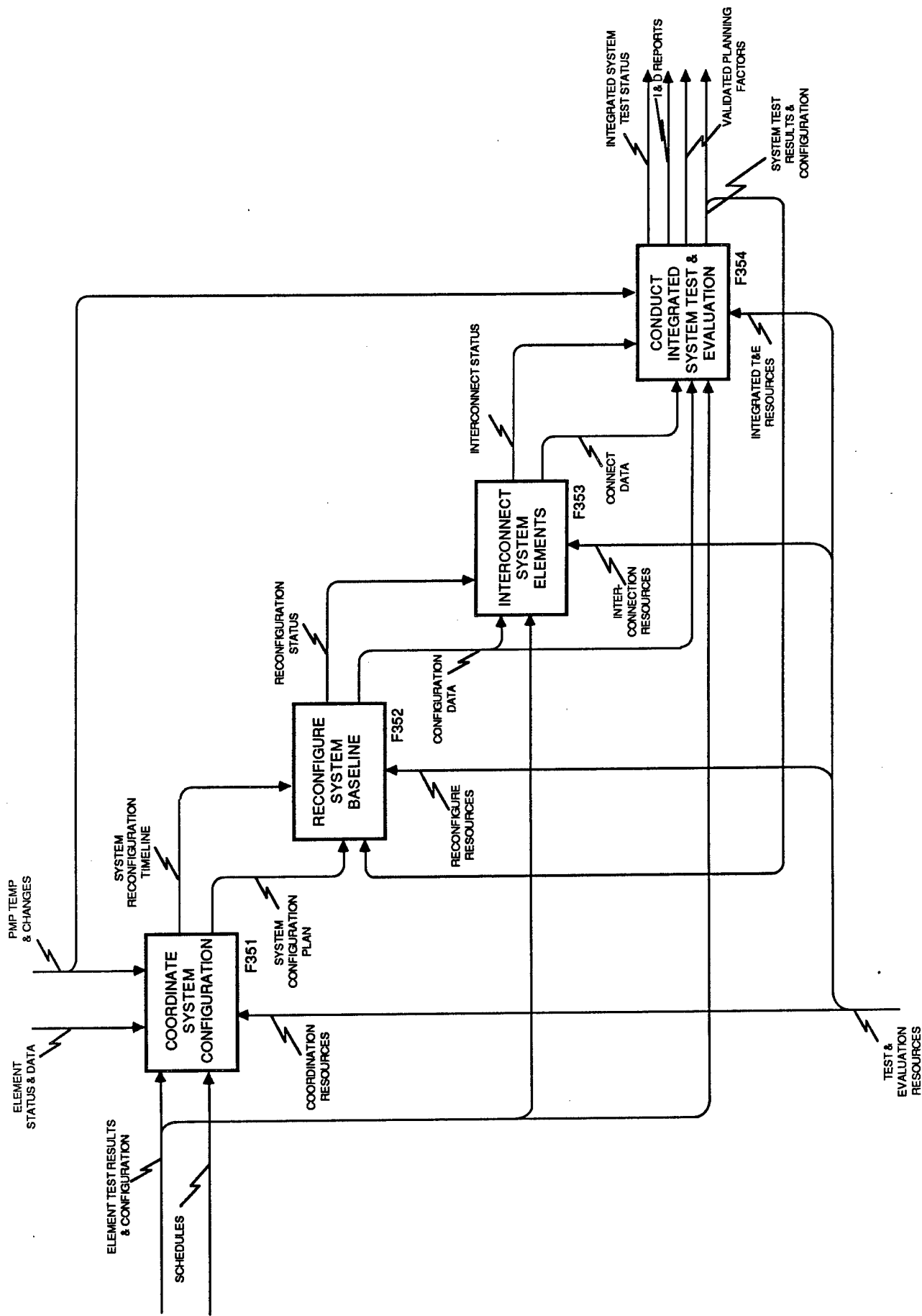
NODE: F32
 TITLE: REVISE & MAINTAIN PROGRAM MASTER PLANS



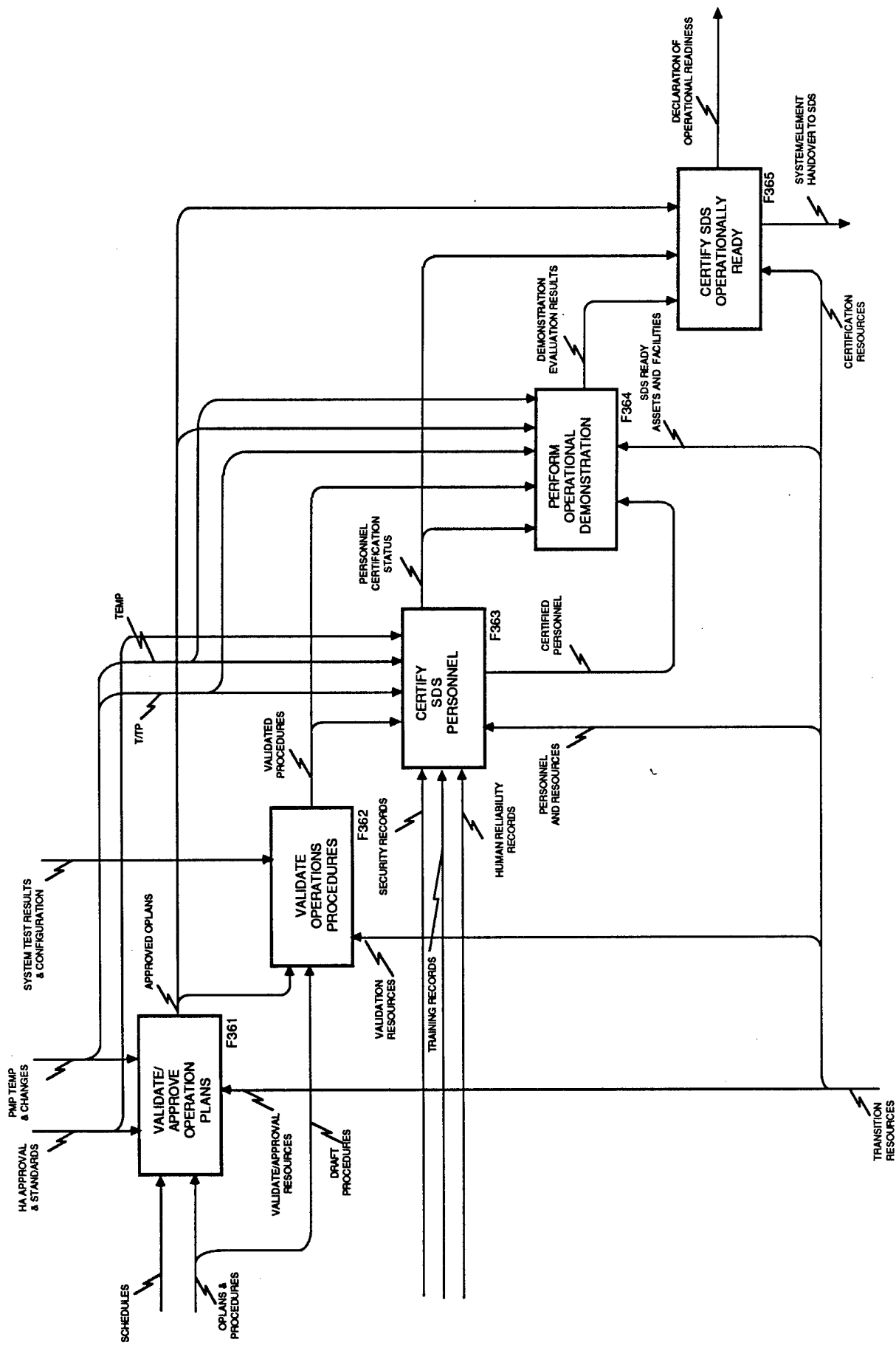
NODE: F33
TITLE: DEPLOY ASSETS



NODE: F34
TITLE: CONNECT SDS ELEMENT ASSETS



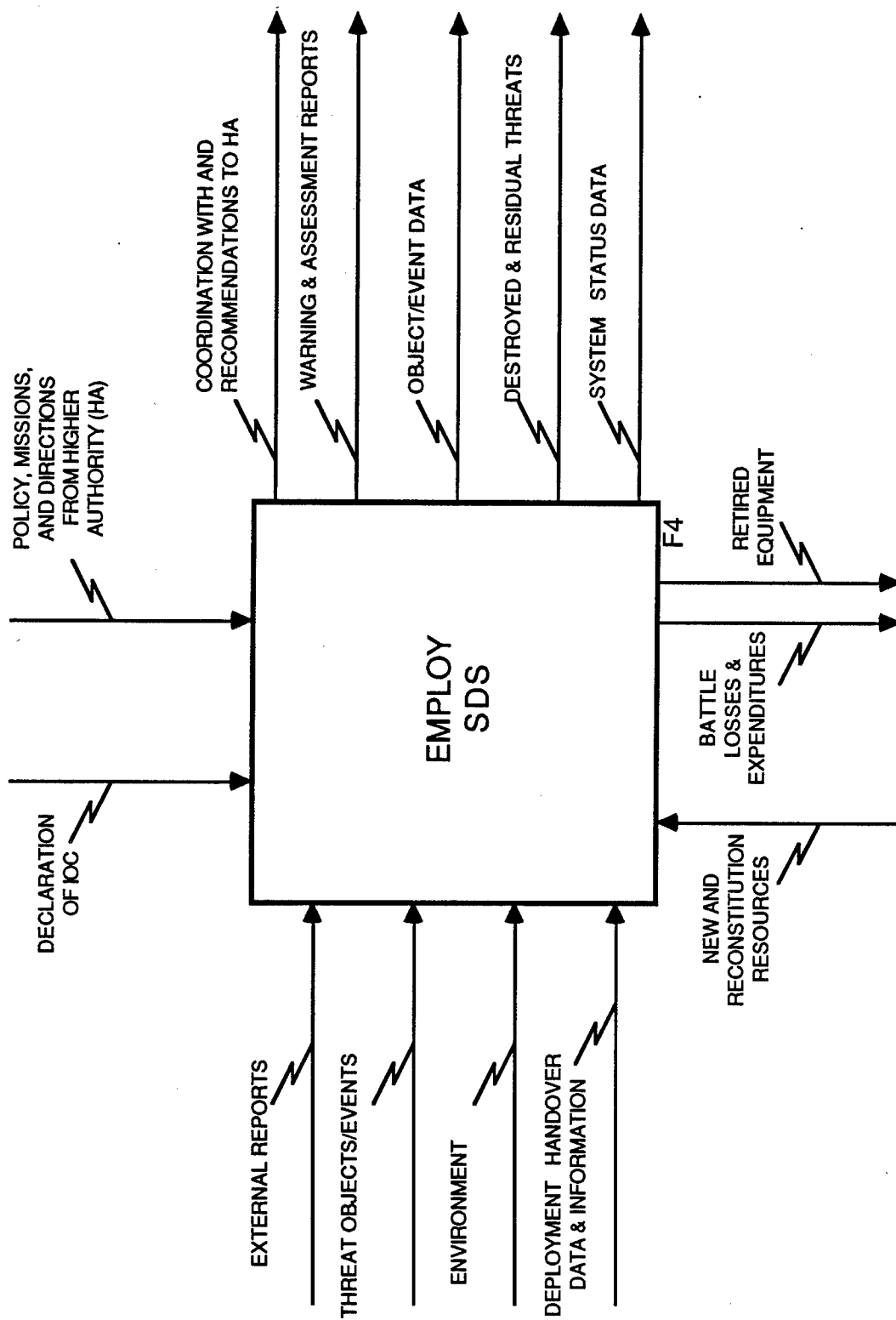
NODE: F35
TITLE: CONDUCT SYSTEM TEST & EVALUATION



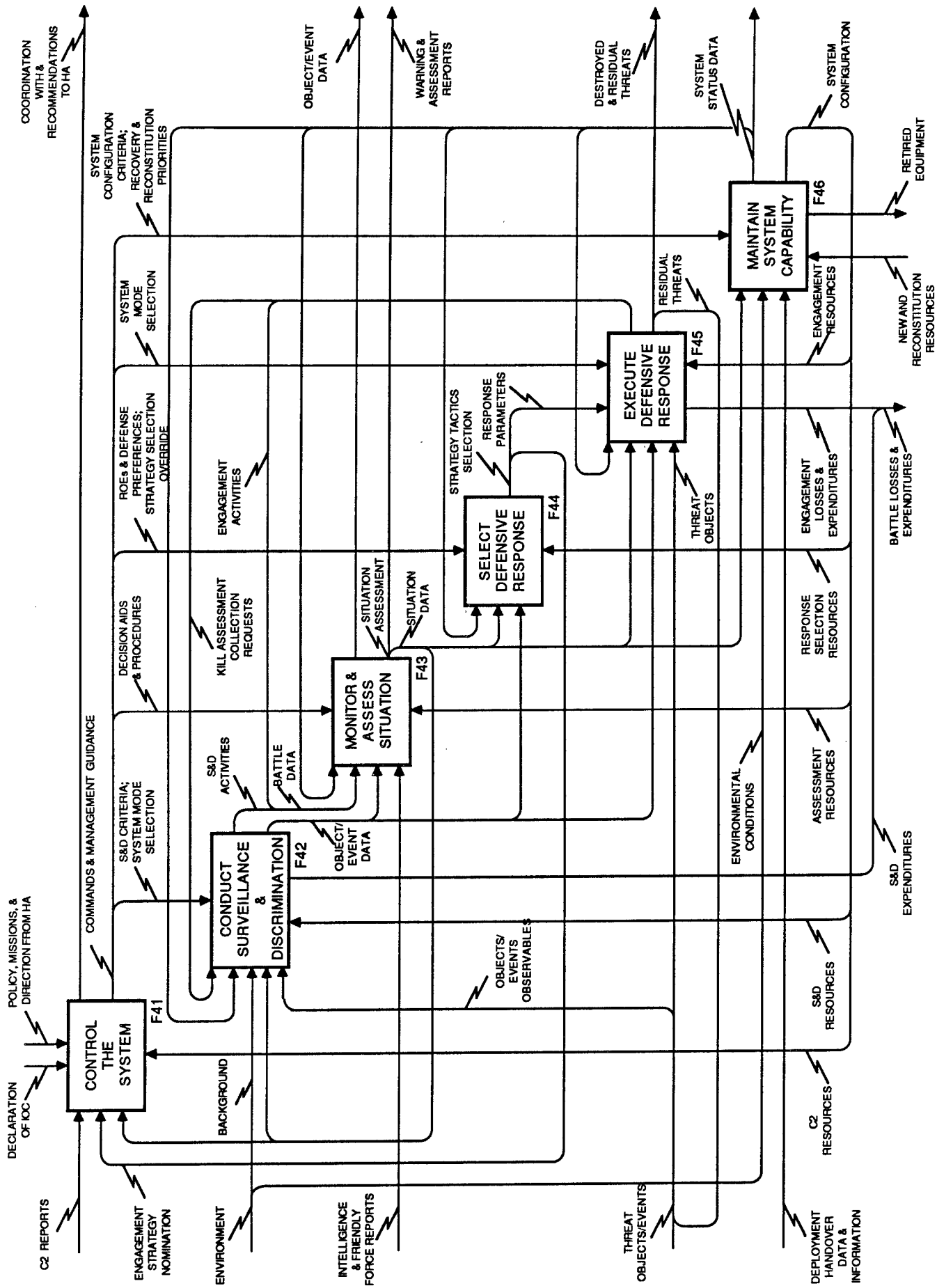
NODE: F36
TITLE: TRANSITION TO IOC

STRATEGIC DEFENSE SYSTEM

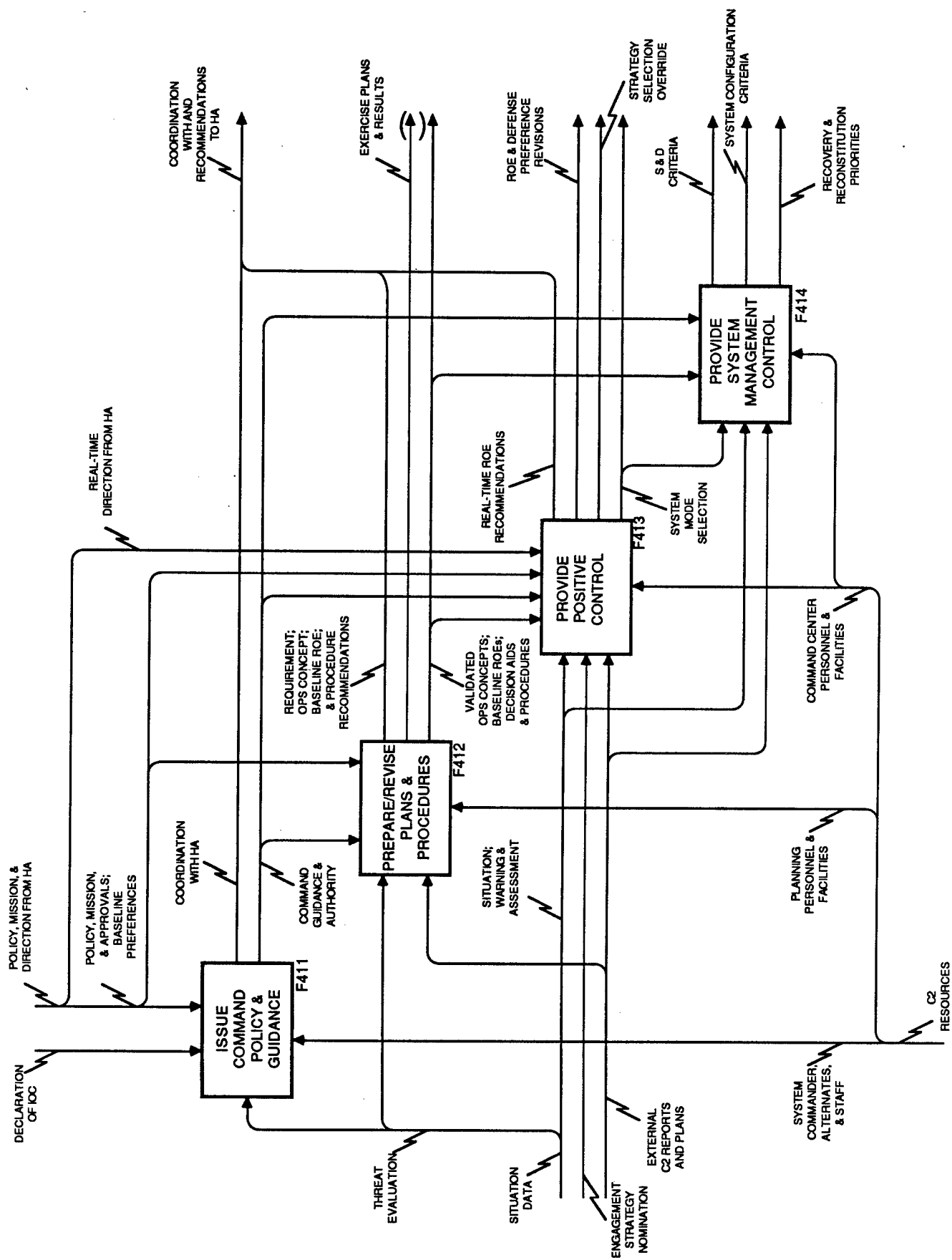
**IDEFo FLOWS
(EMPLOYMENT)**



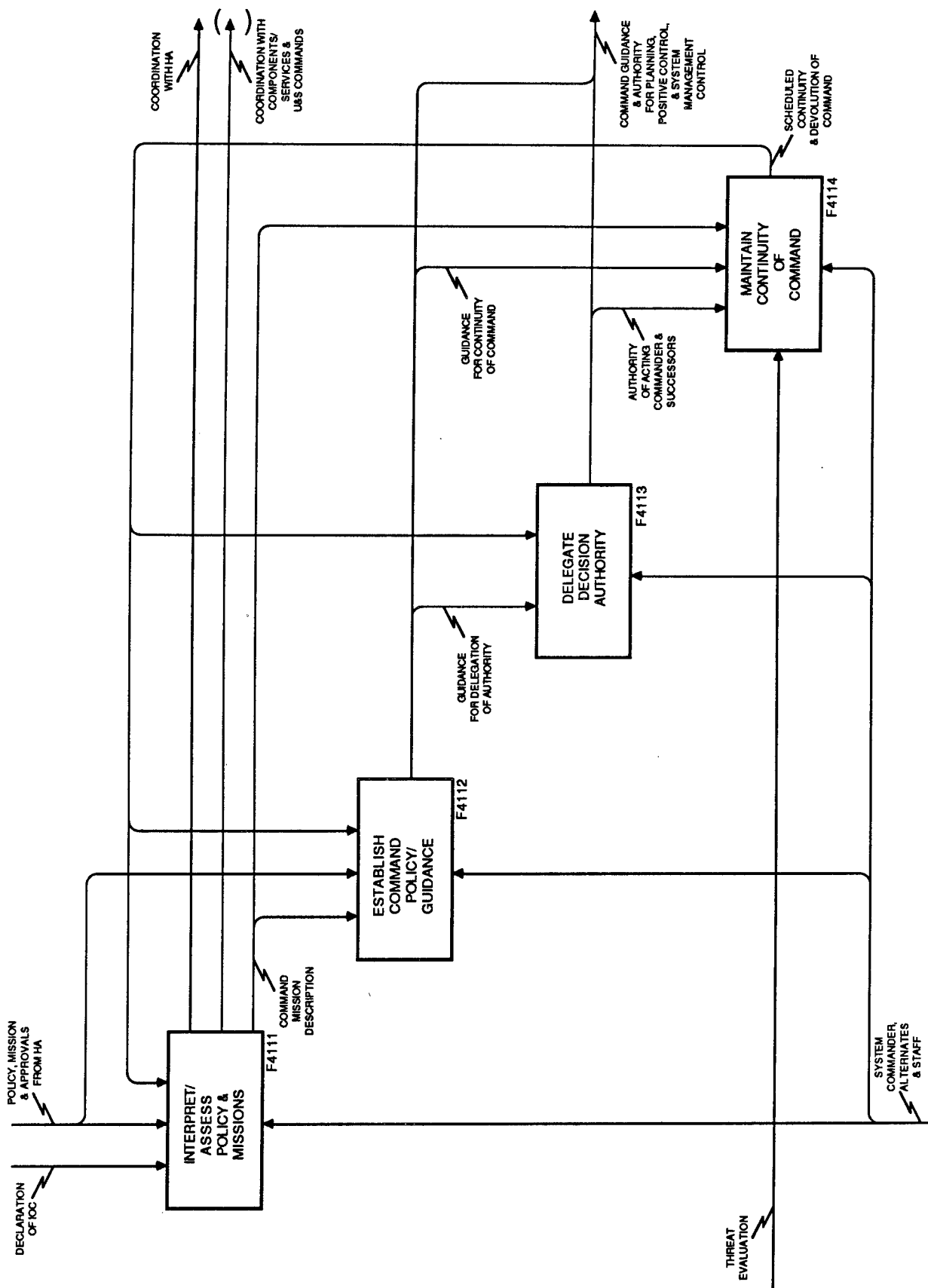
NODE: F4
TITLE: I/O BOUNDARY OF "EMPLOY SDS," F4



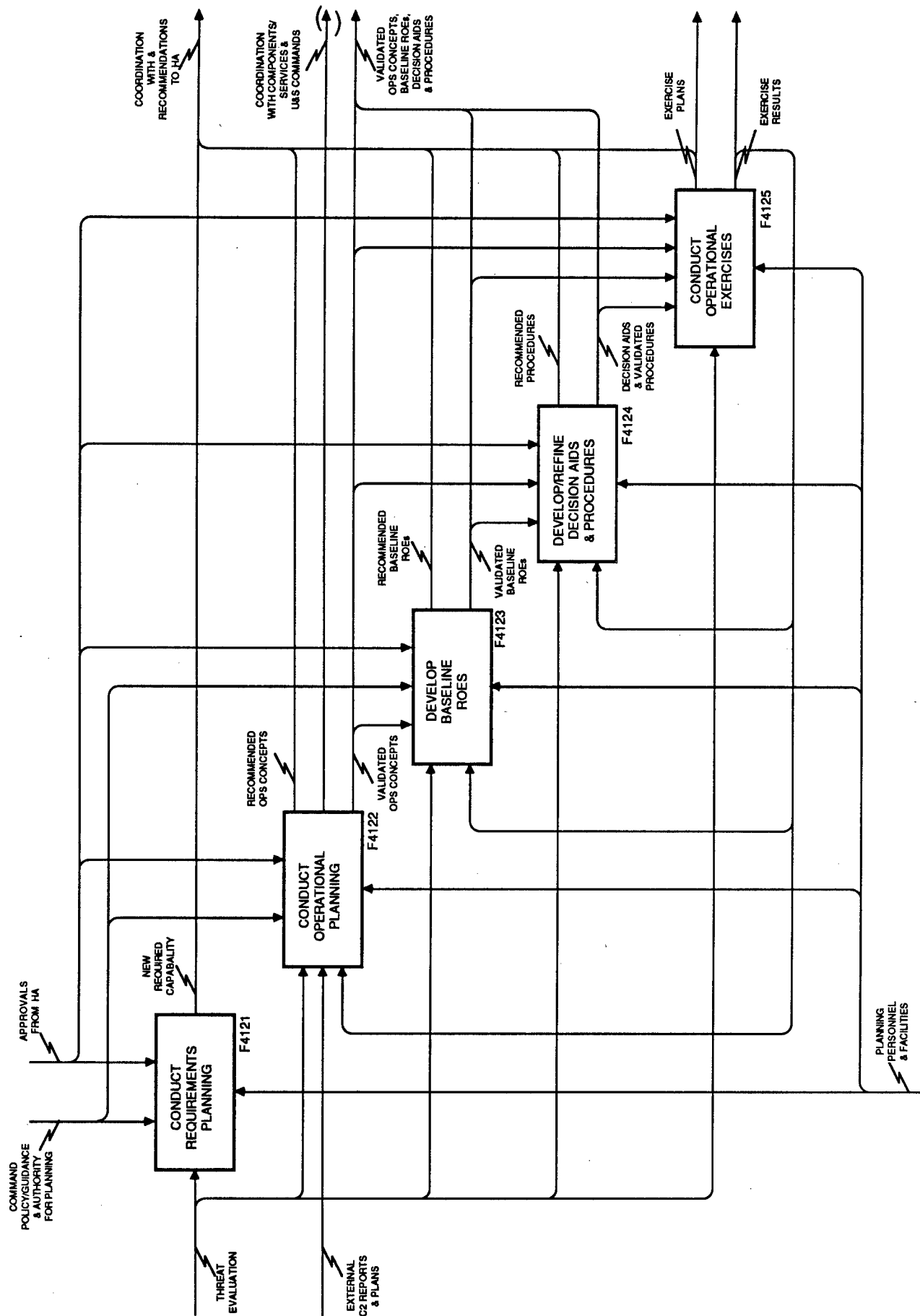
NODE: F4
TITLE: EMPLOY SDS



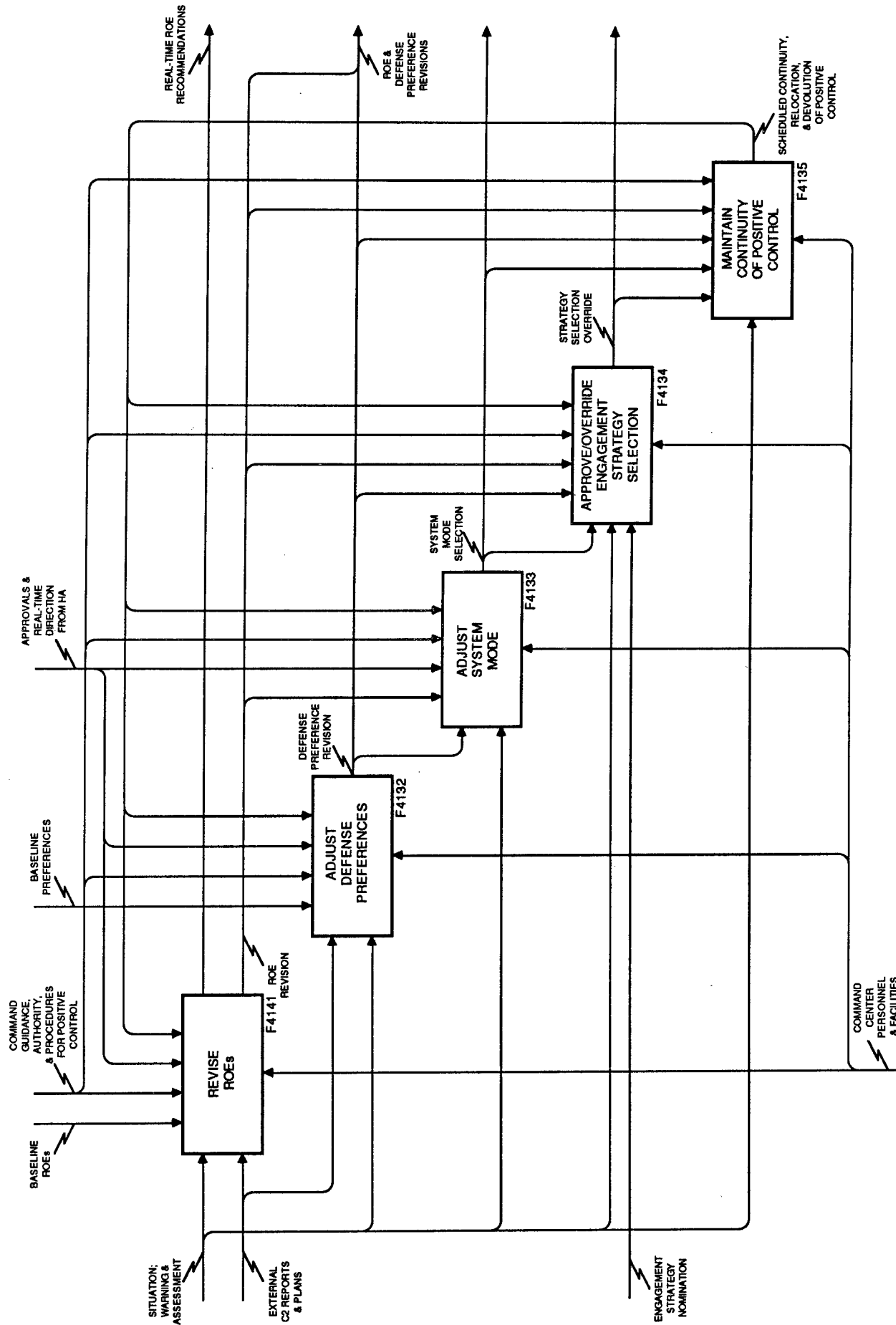
NODE: F41 **TITLE: CONTROL THE SYSTEM**



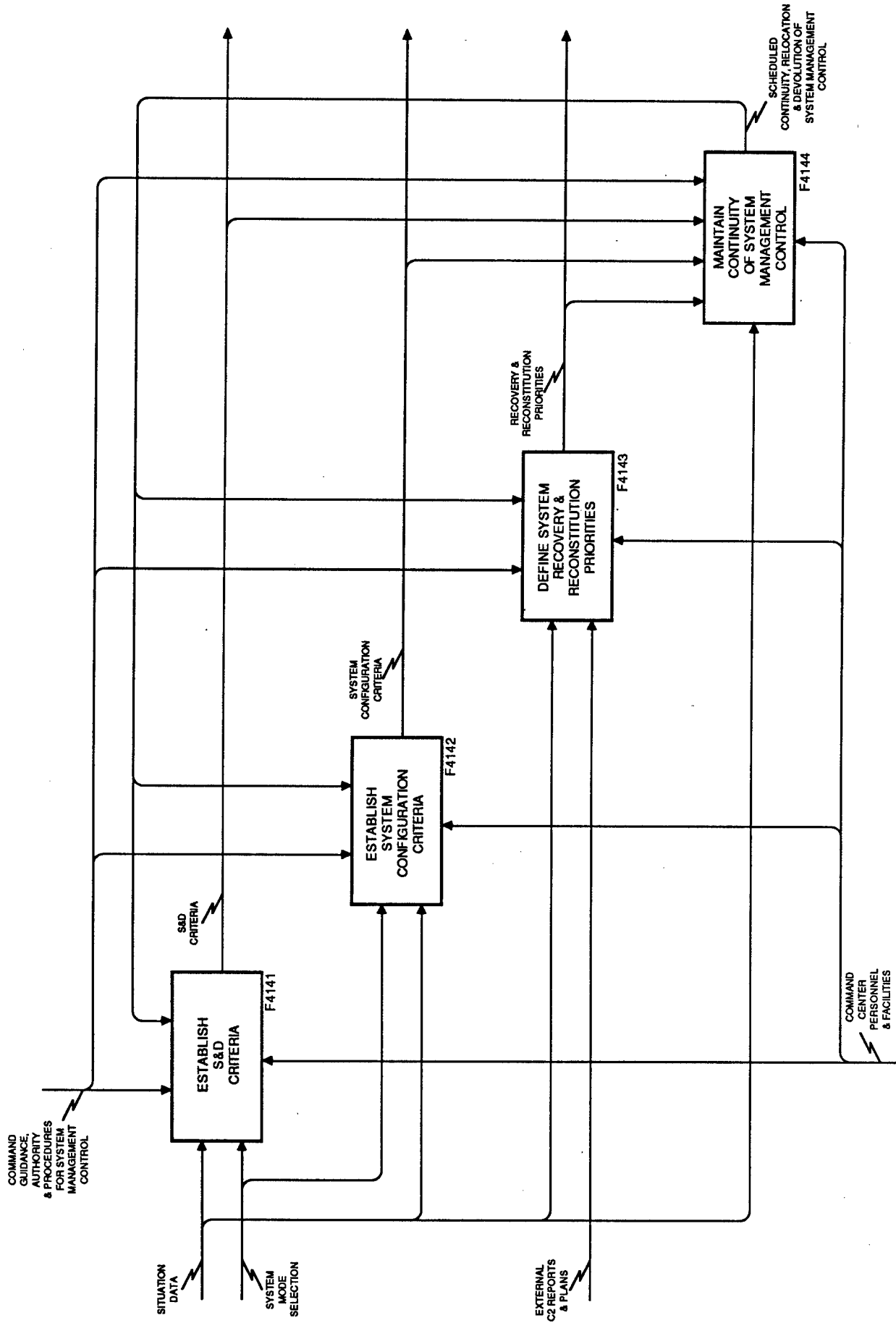
NODE: F411
TITLE: ISSUE COMMAND POLICY AND GUIDANCE



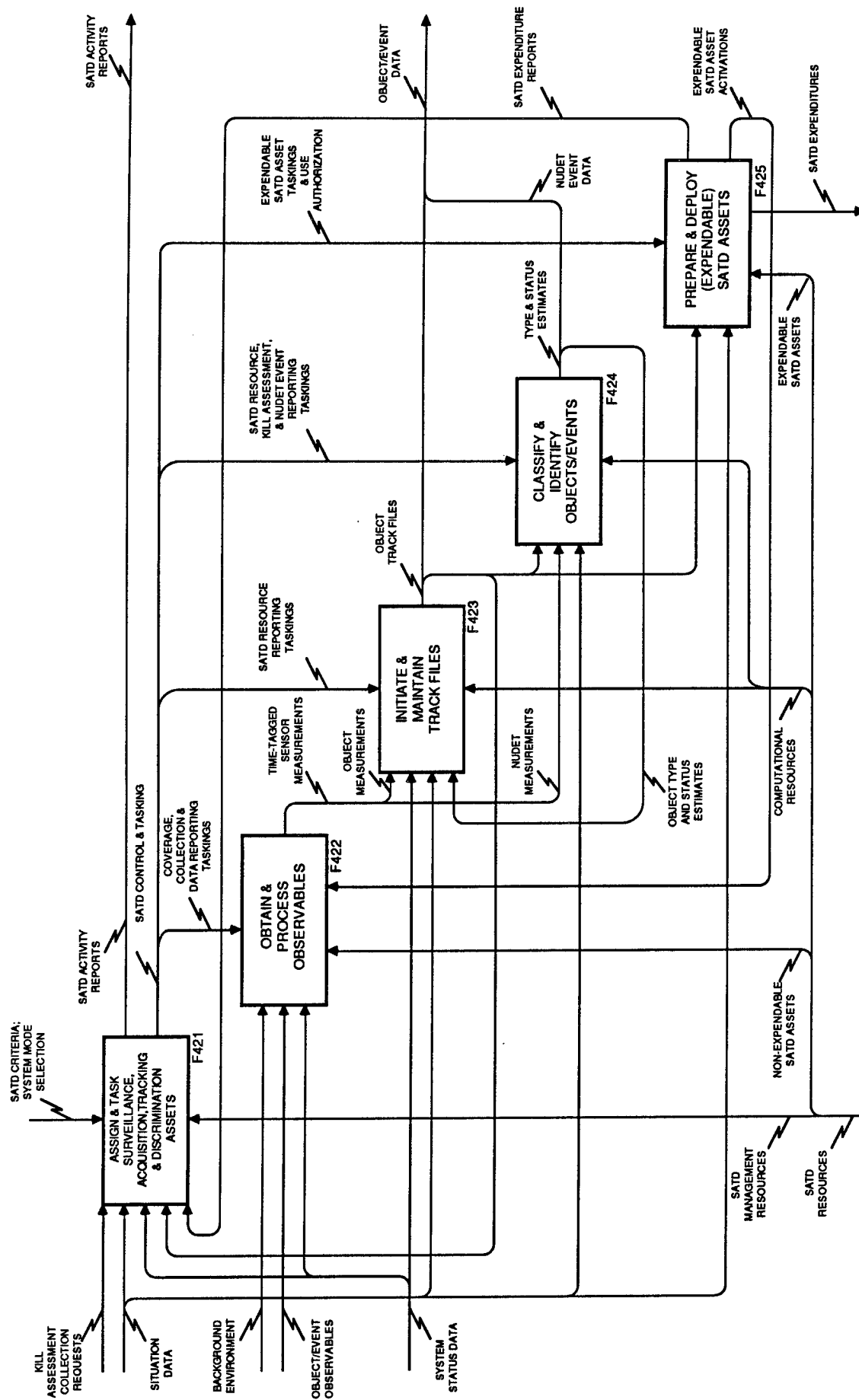
NODE: F412
TITLE: PREPARE/REVISE PLANS AND PROCEDURES



NODE: F413
TITLE: PROVIDE POSITIVE CONTROL



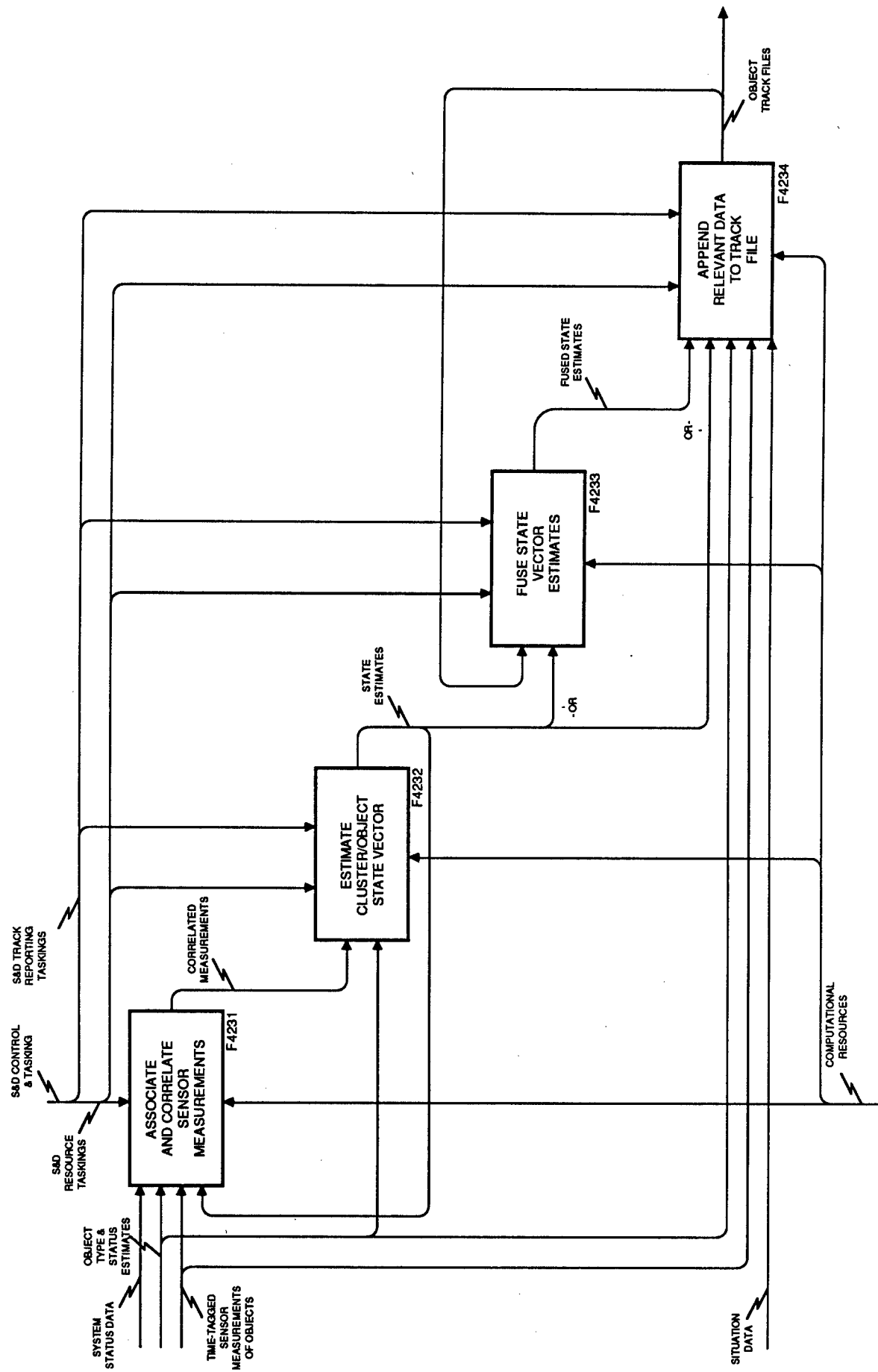
NODE: F414
TITLE: PROVIDE SYSTEM MANAGEMENT CONTROL



TITLE: CONDUCT SURVEILLANCE, ACQUISITION, TRACKING AND DISCRIMINATION (SATD)
 NODE: F42

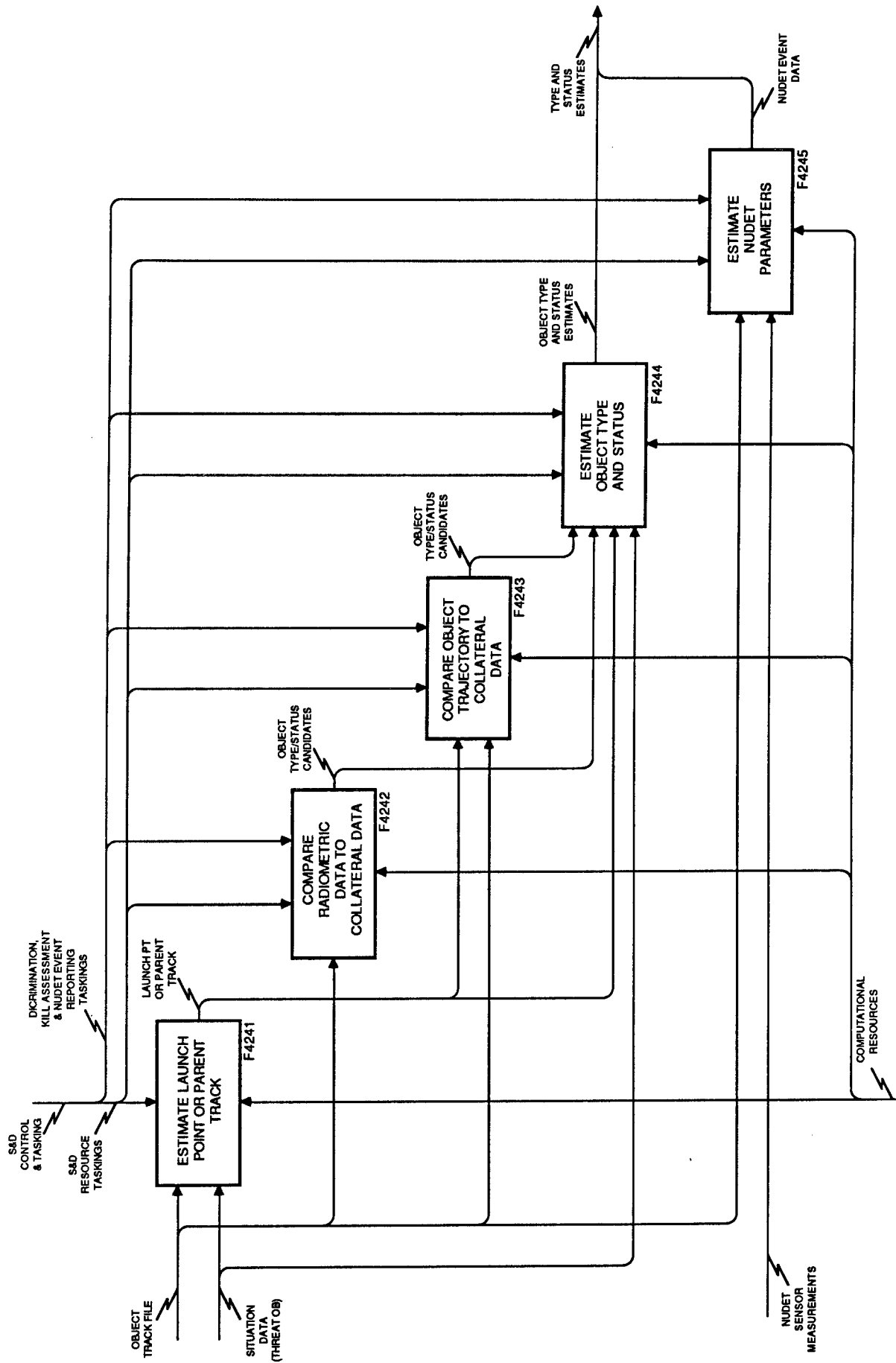






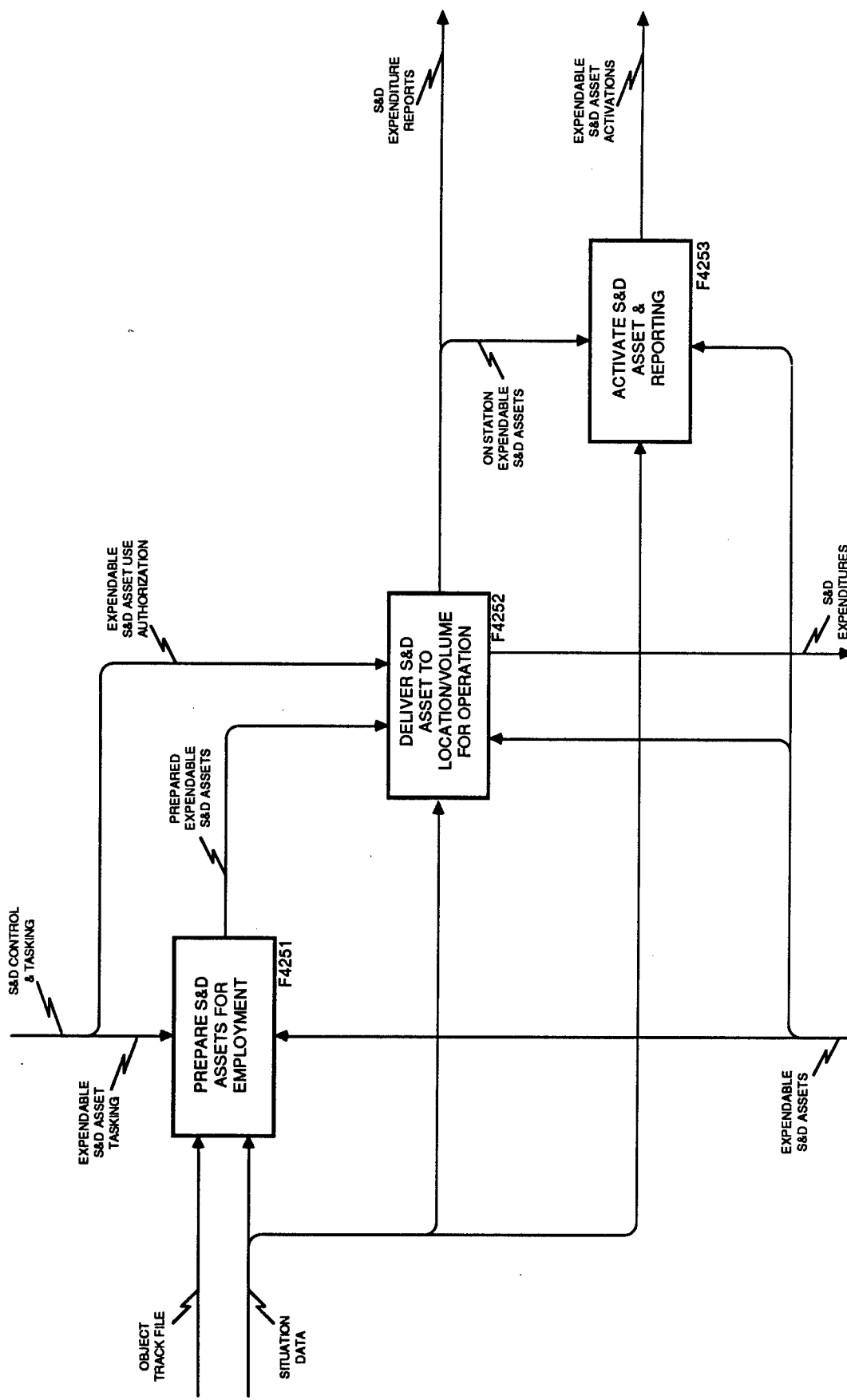
NODE: F423

TITLE: INITIATE AND MAINTAIN OBJECT TRACK FILES



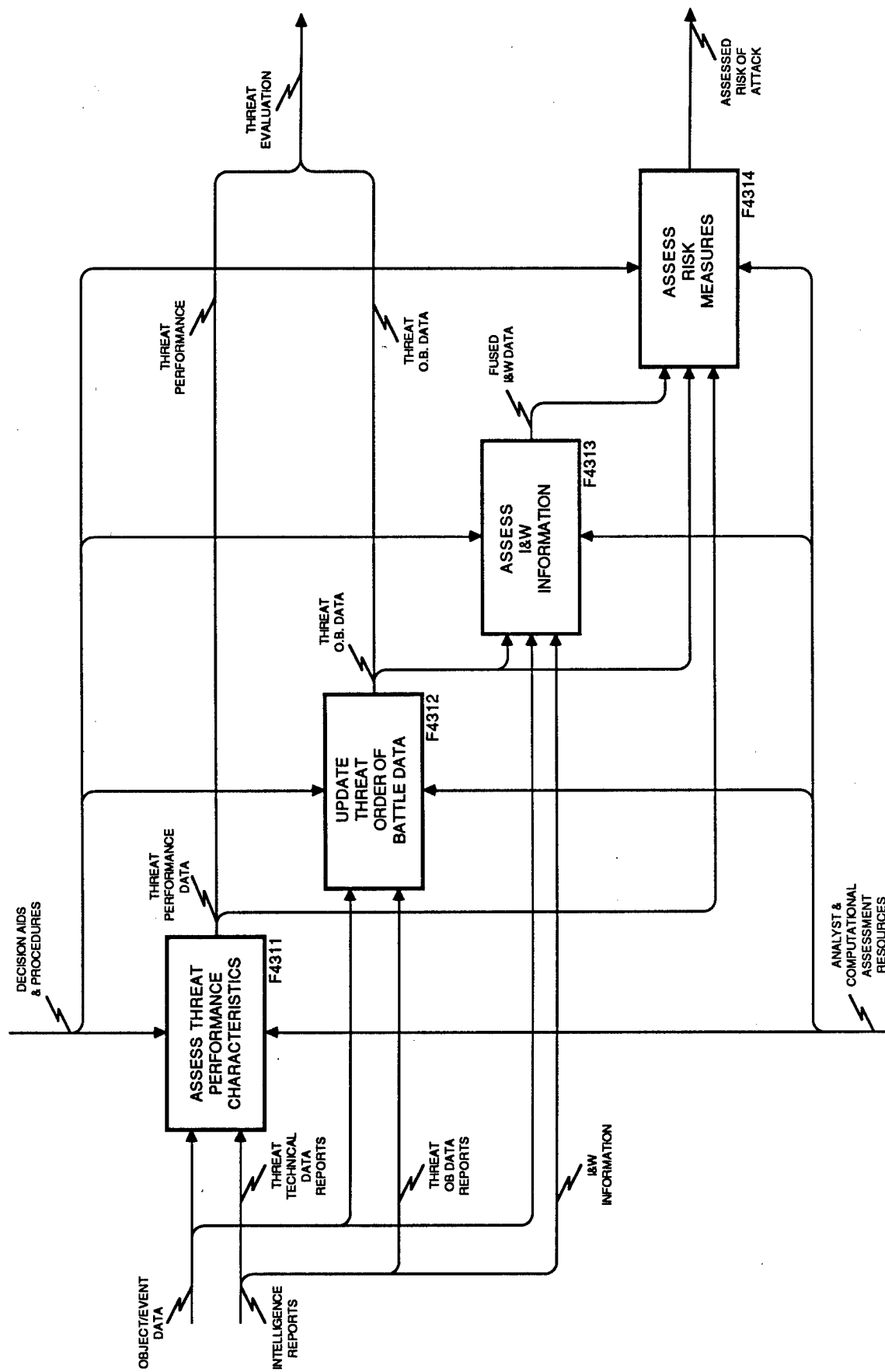
NODE: F424

TITLE: CLASSIFY AND IDENTIFY OBJECTS/EVENTS

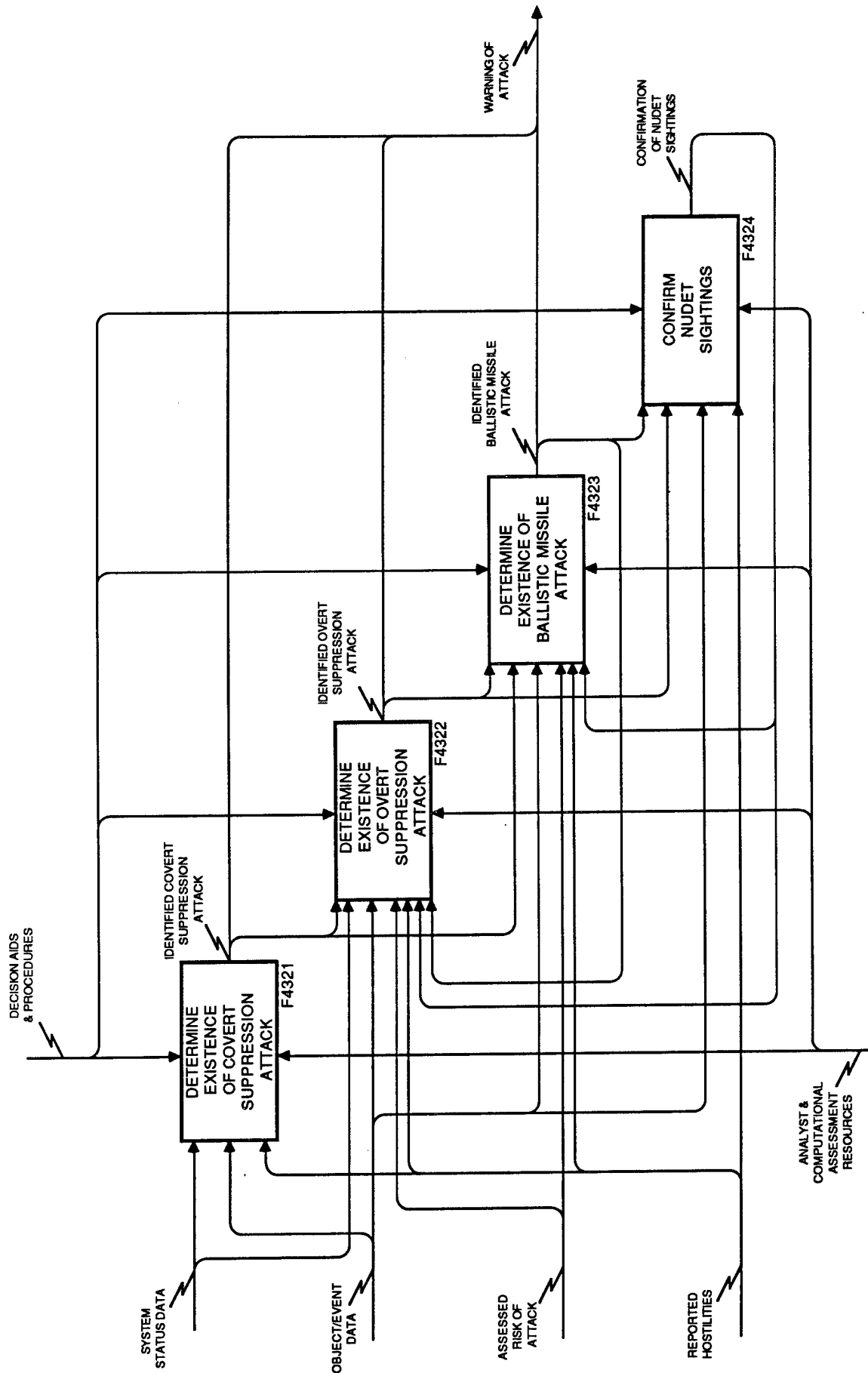


NODE: F425
TITLE: EMPLOY EXPENDABLE S&D ASSETS



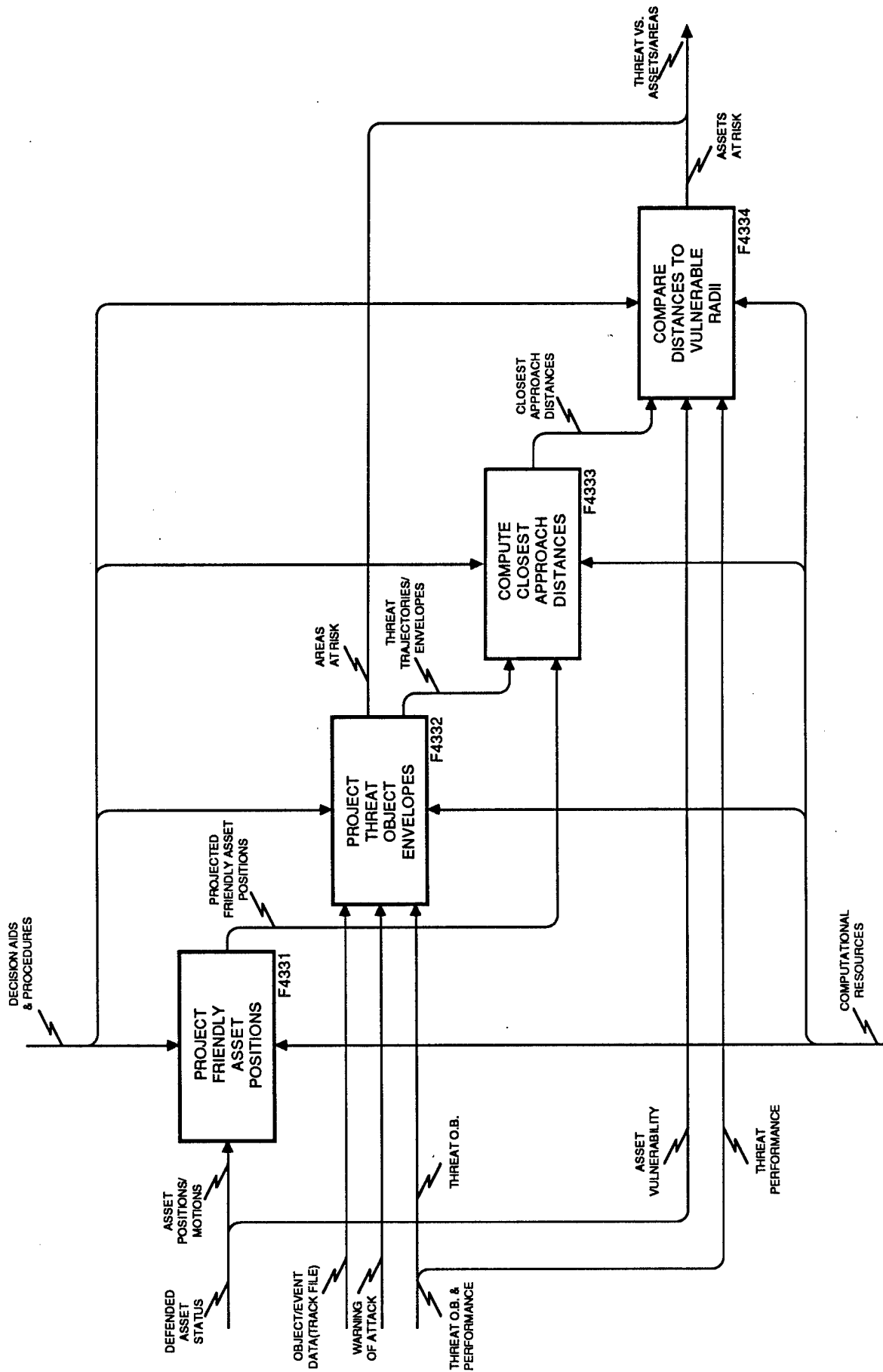


NODE: F431
TITLE: ASSESS THREAT FORCE STATUS

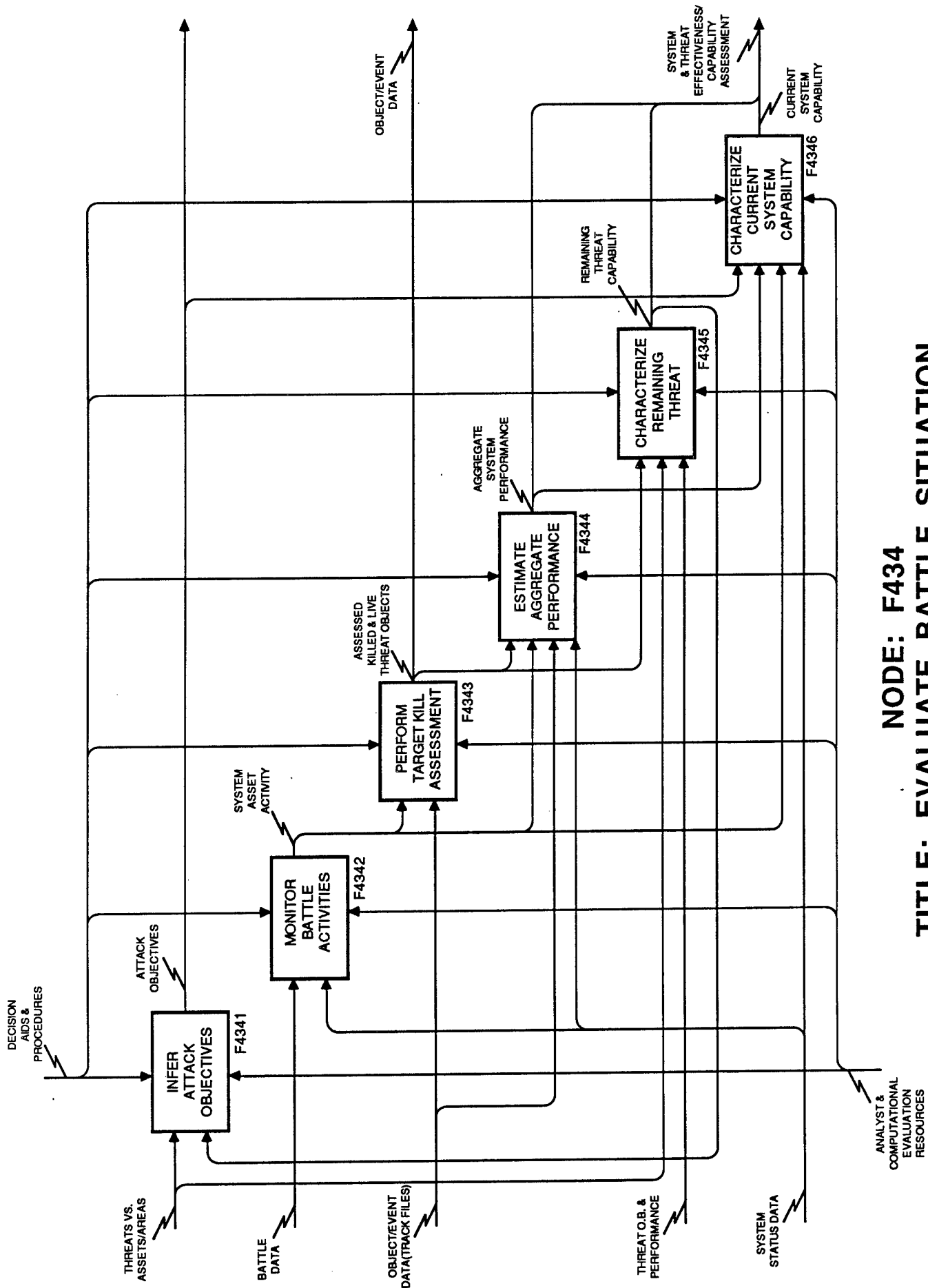


NODE: F432

TITLE: DETERMINE EXISTENCE OF ATTACK

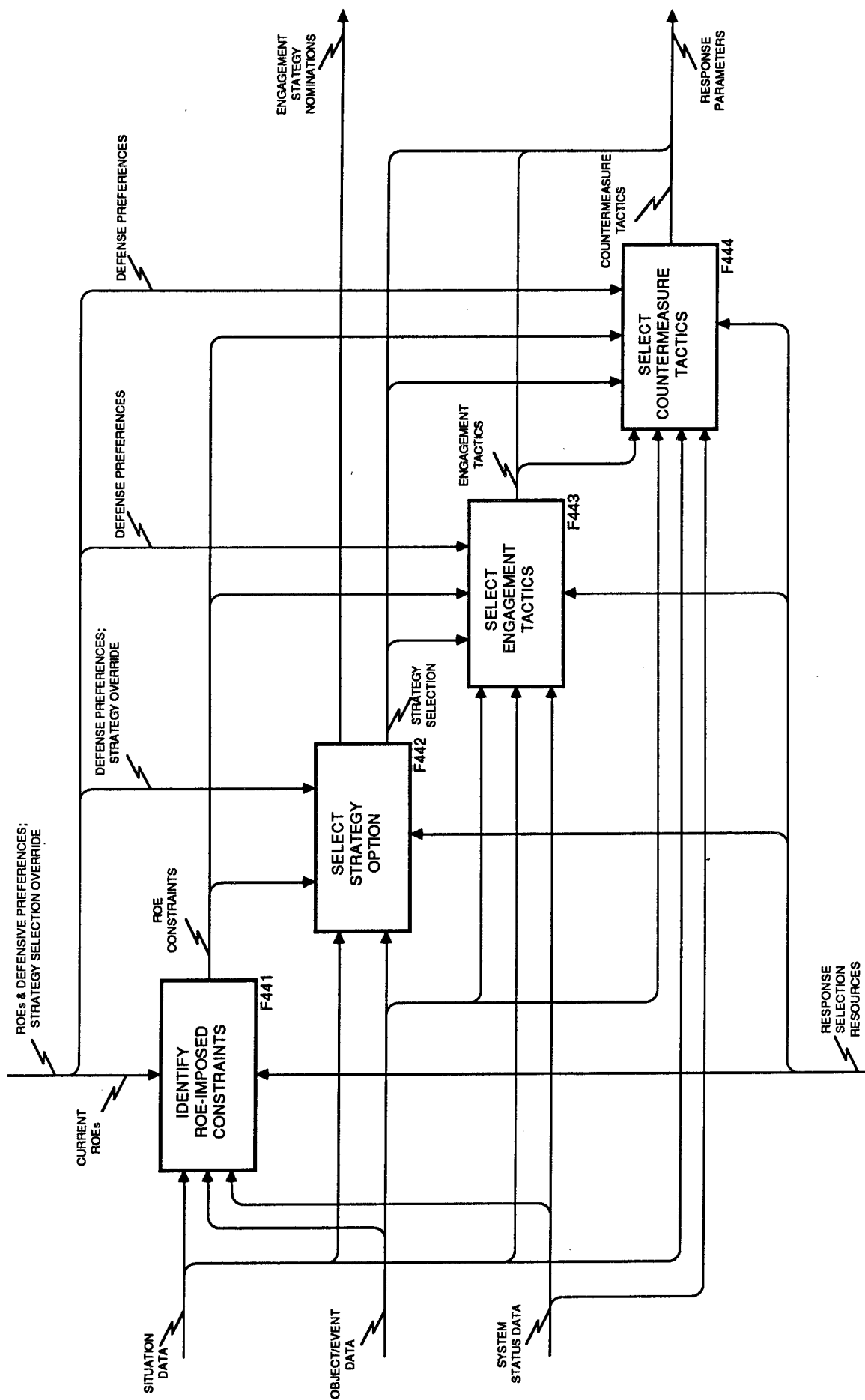


NODE: F433
TITLE: DETERMINE ASSETS/AREAS AT RISK

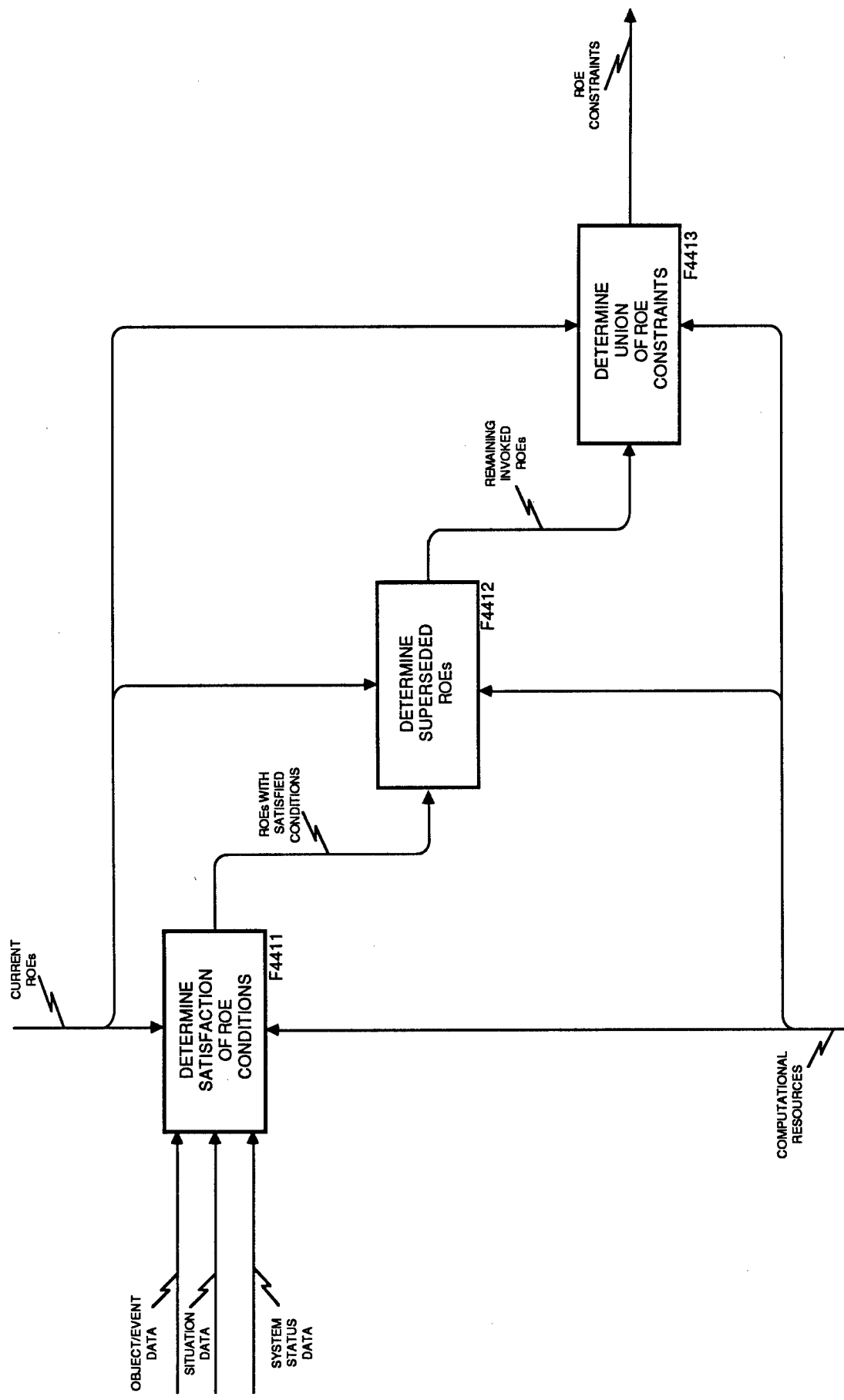


NODE: F434
TITLE: EVALUATE BATTLE SITUATION

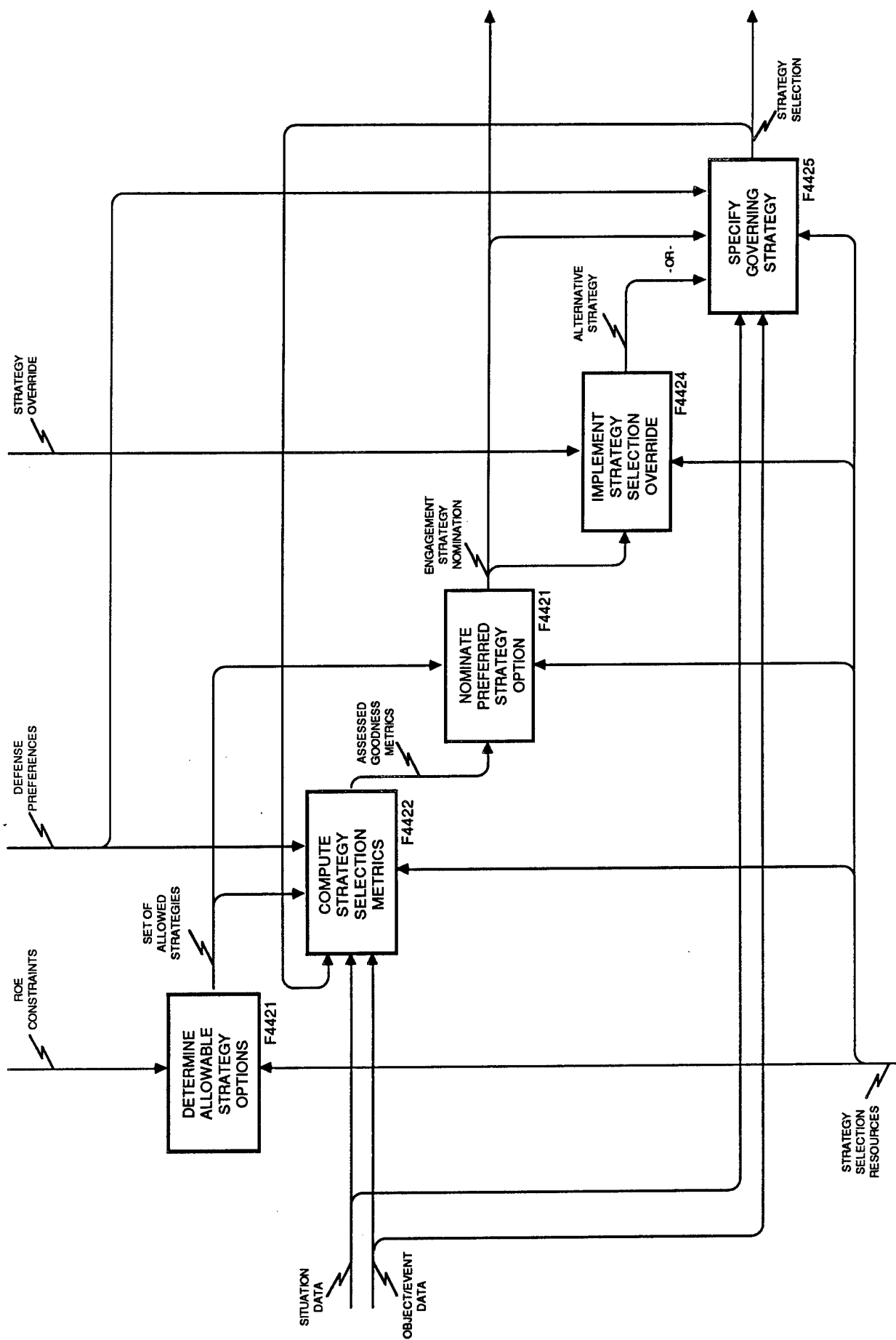




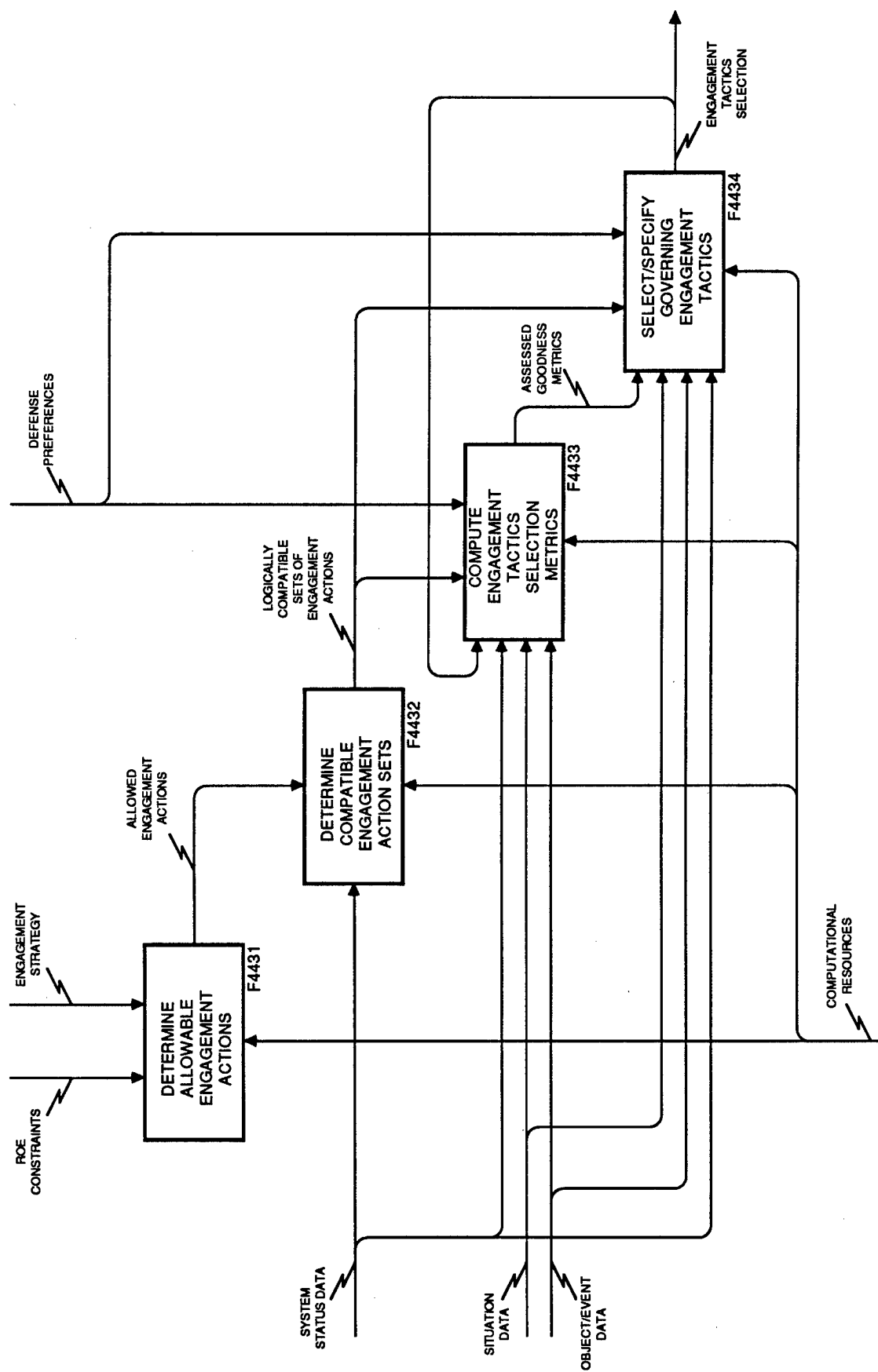
NODE: F44
TITLE: SELECT DEFENSIVE RESPONSE



NODE: F441
TITLE: IDENTIFY ROE-IMPOSED CONSTRAINTS

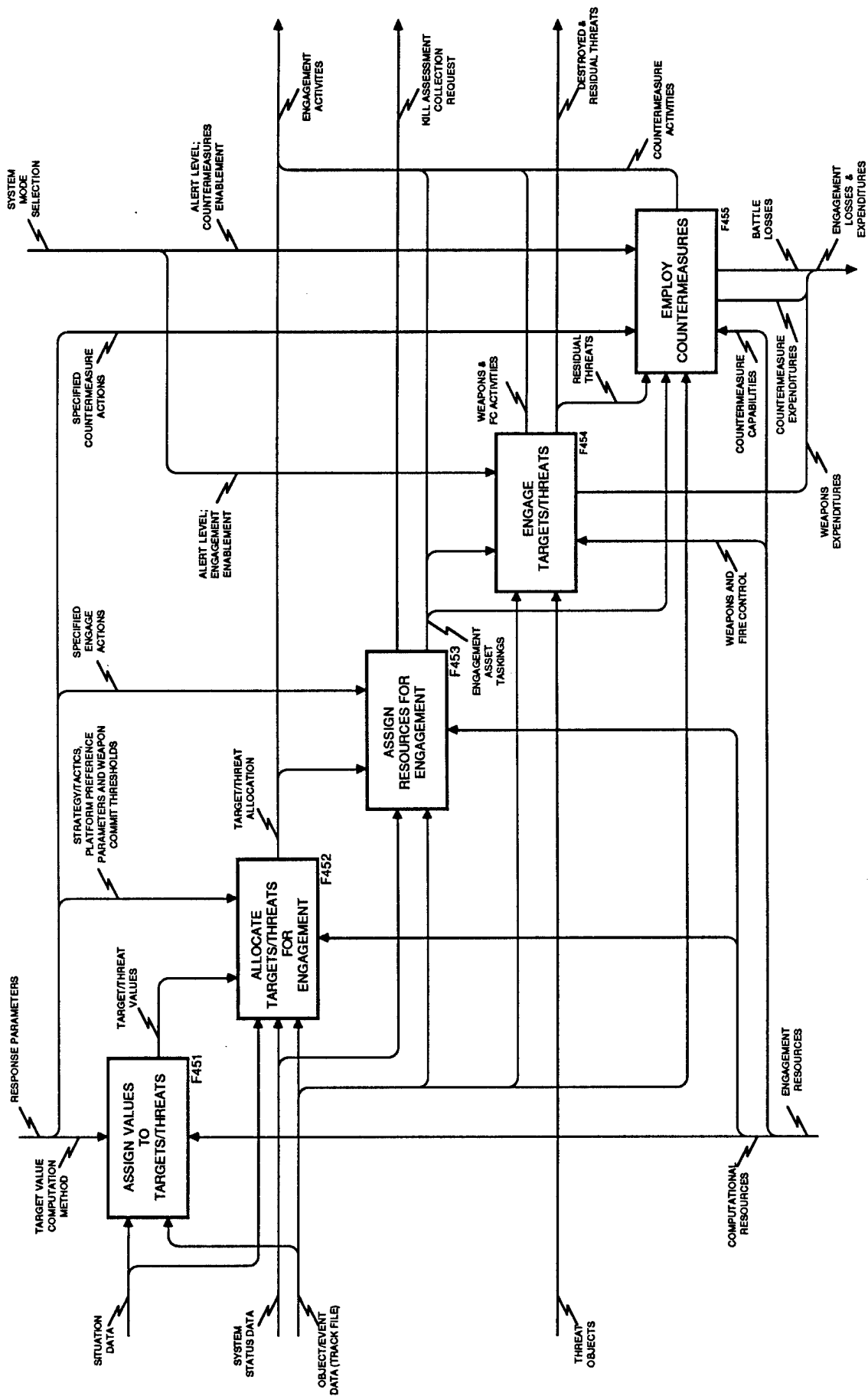


NODE: F442
TITLE: SELECT STRATEGY OPTION

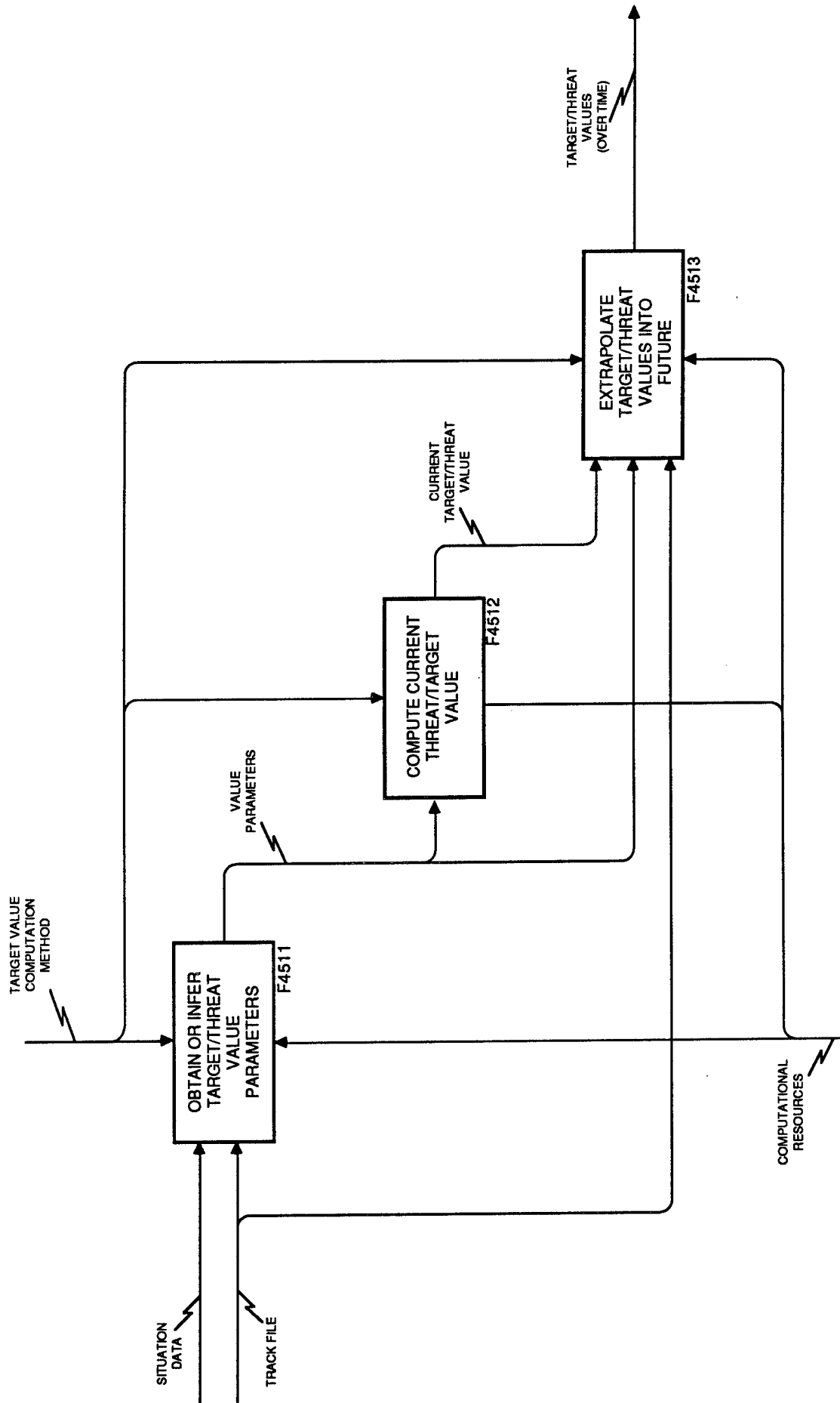


NODE: F443
TITLE: SELECT ENGAGEMENT TACTICS

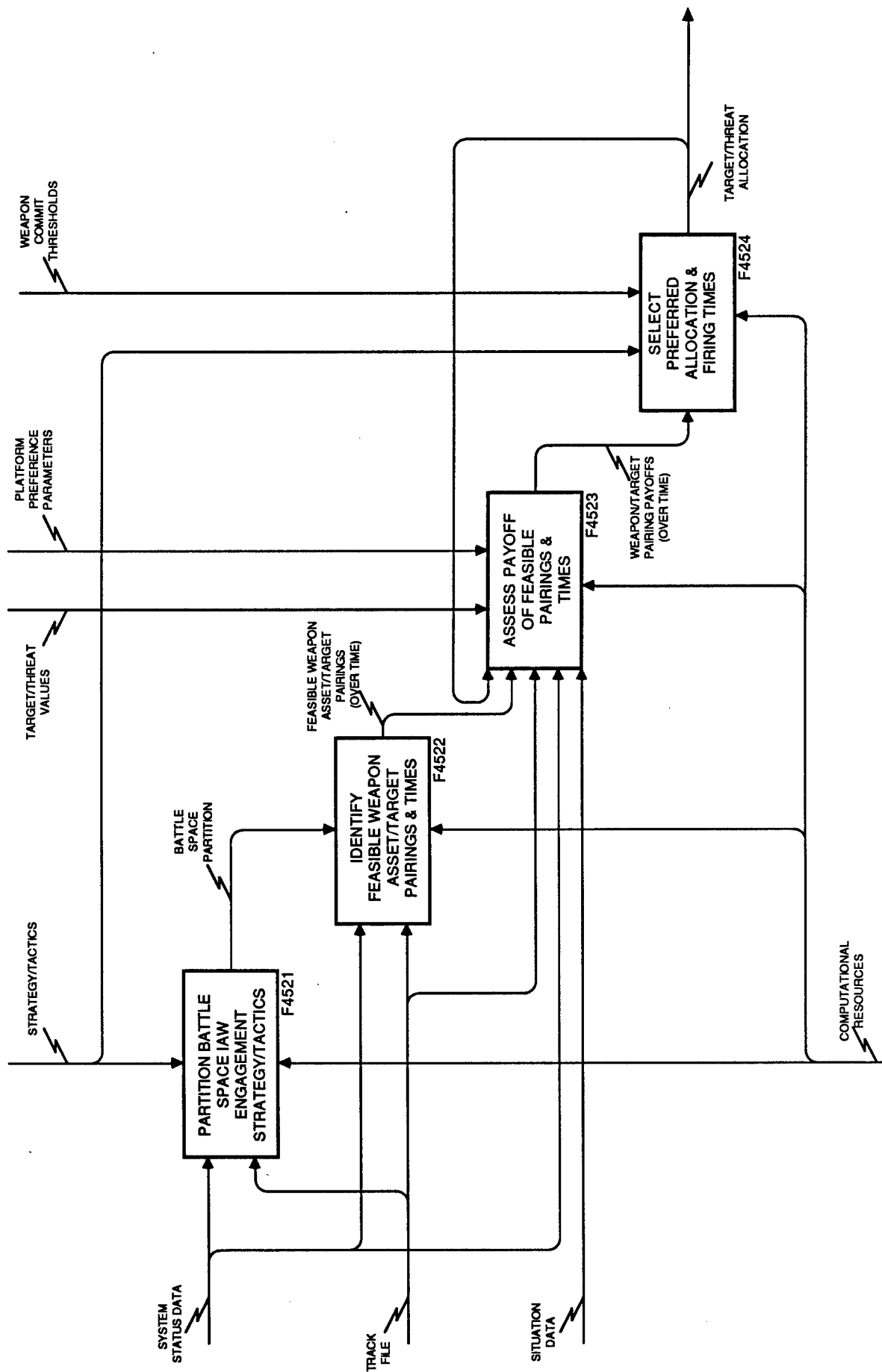




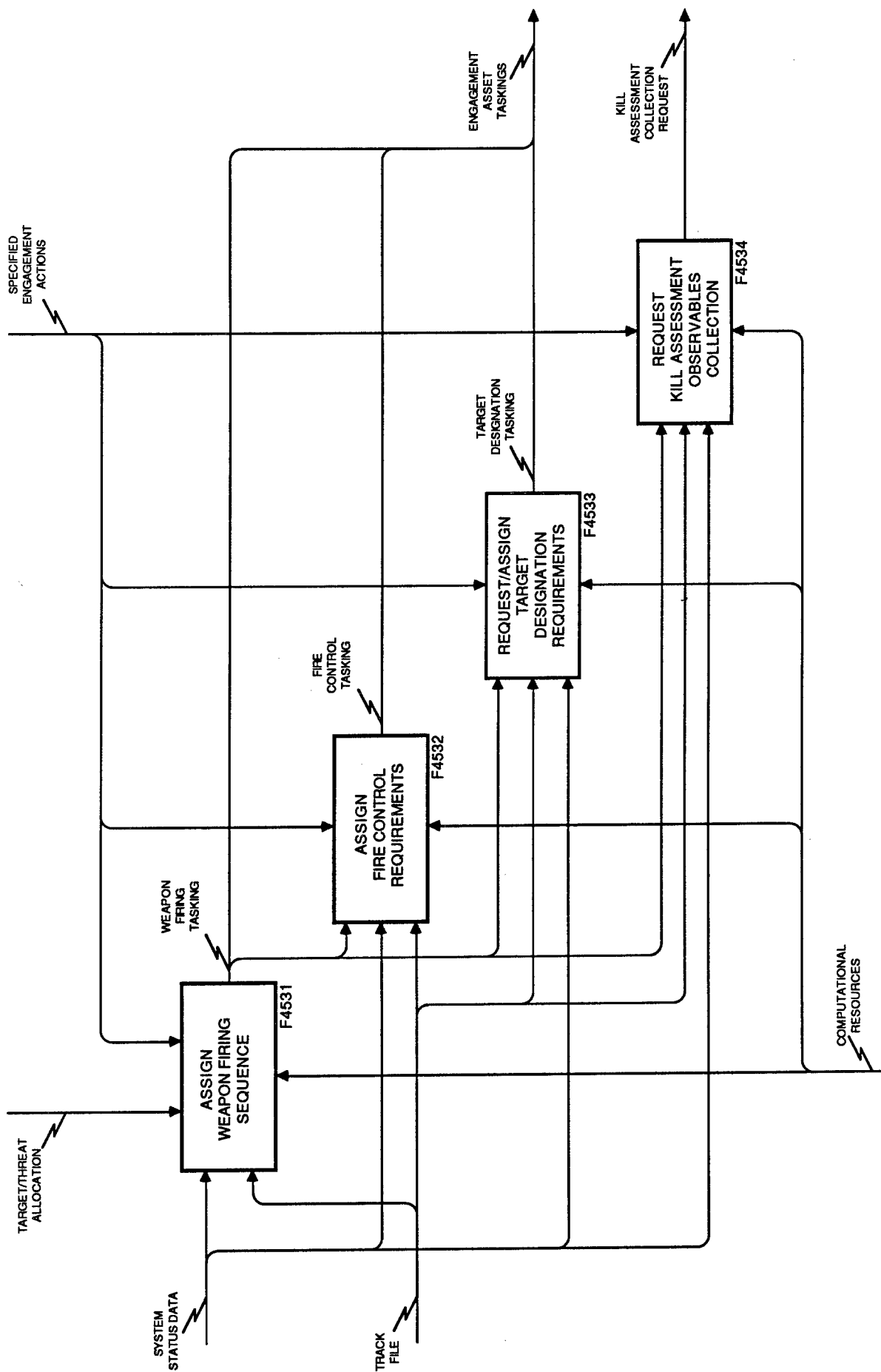
NODE: F45
TITLE: EXECUTE DEFENSIVE RESPONSE



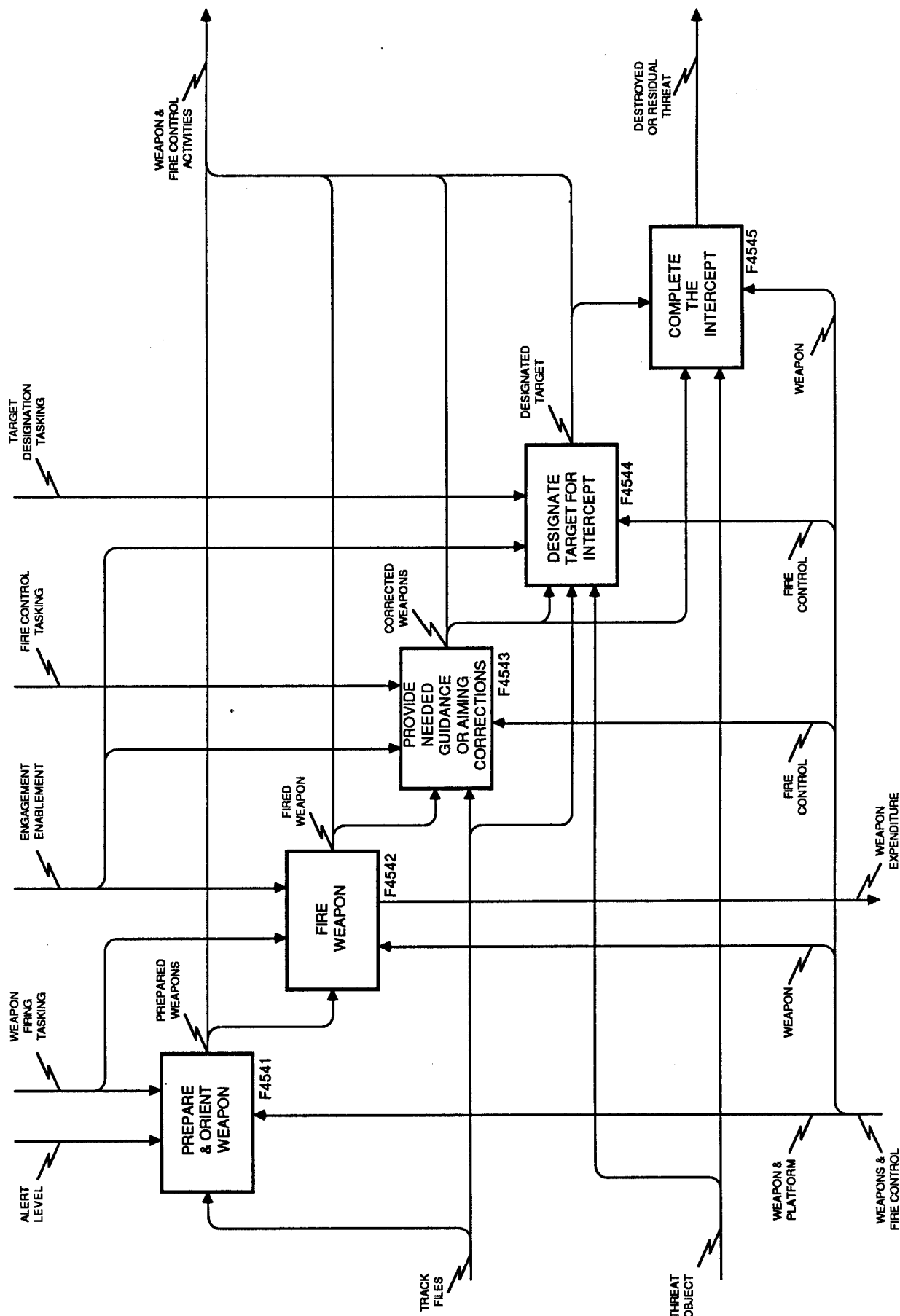
NODE: F451
TITLE: ASSIGN VALUES TO TARGETS/THREATS



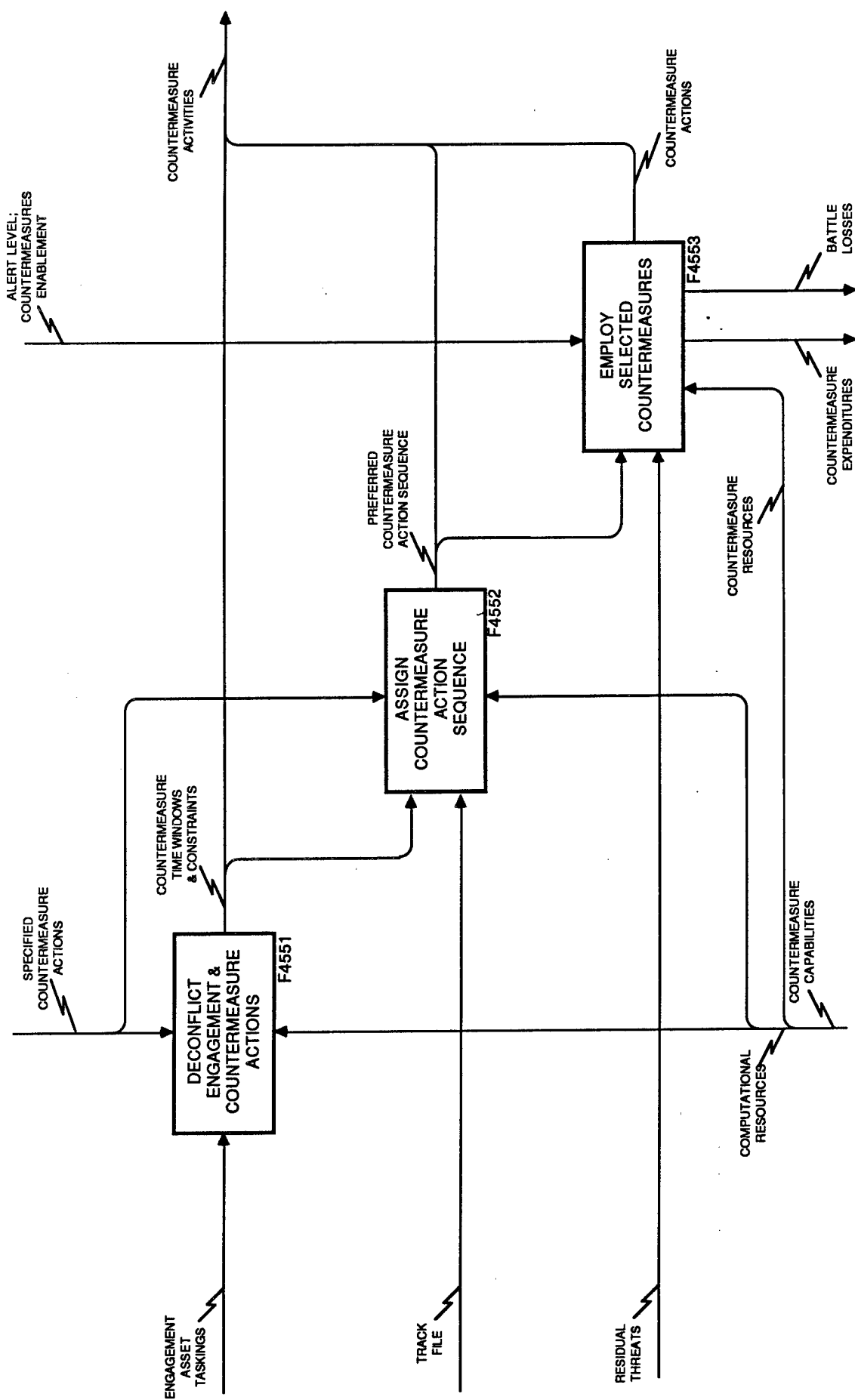
NODE: F452
TITLE: ALLOCATE TARGETS/THREATS FOR ENGAGEMENT



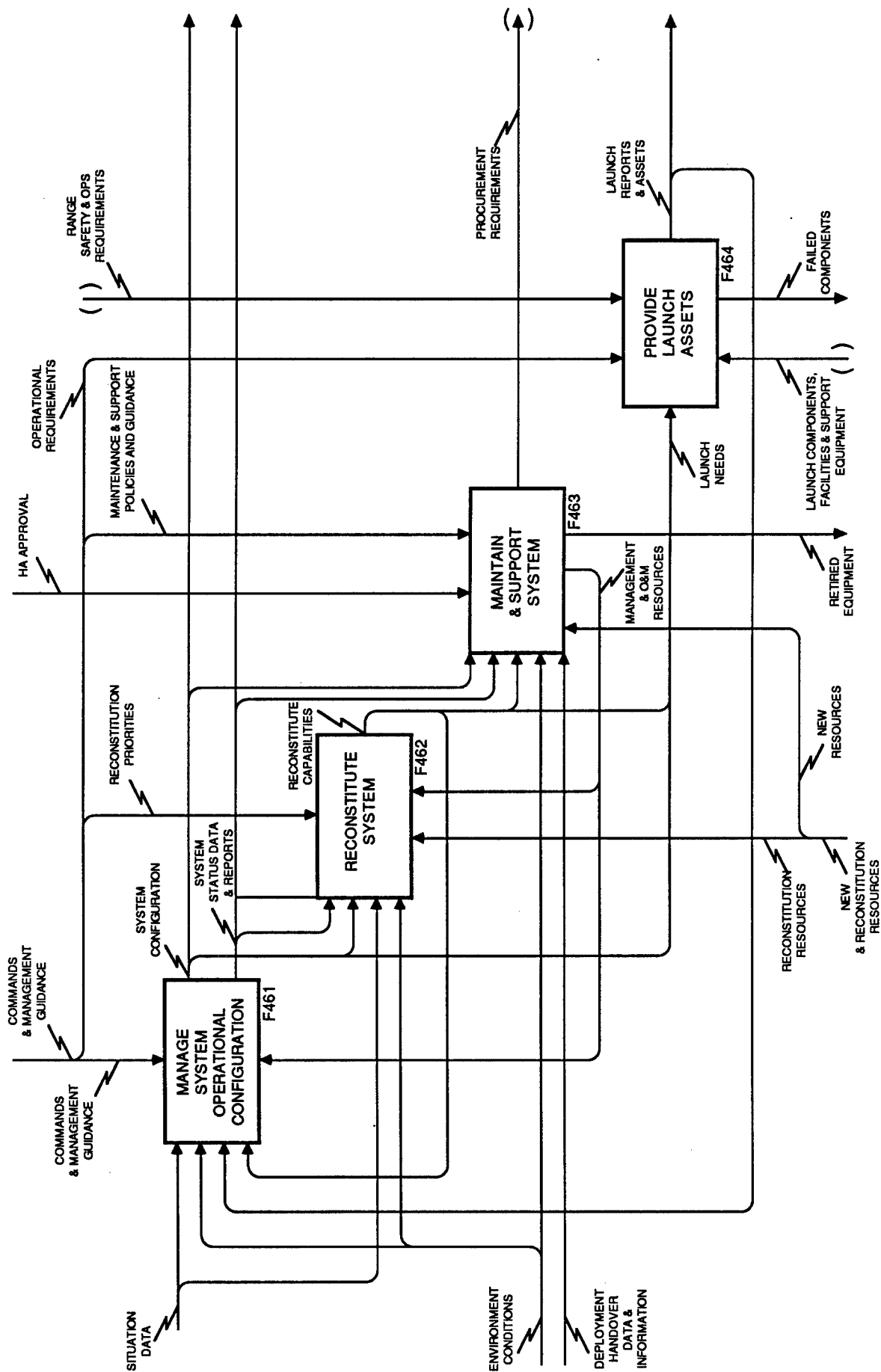
NODE: F453
TITLE: ASSIGN RESOURCES FOR ENGAGEMENT



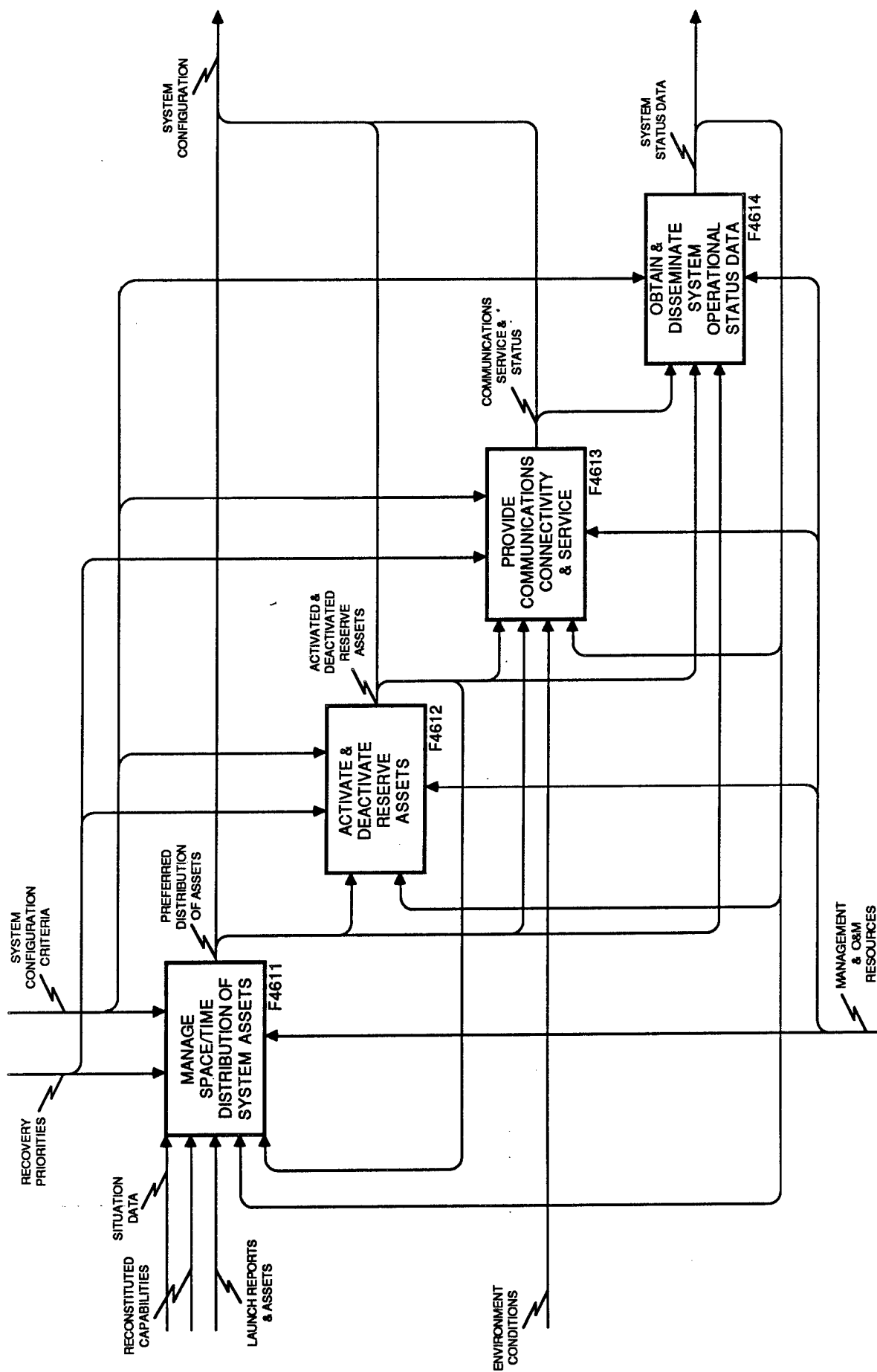
NODE: F454
TITLE: ENGAGE TARGETS/THREATS



NODE: F455
TITLE: EMPLOY COUNTERMEASURES

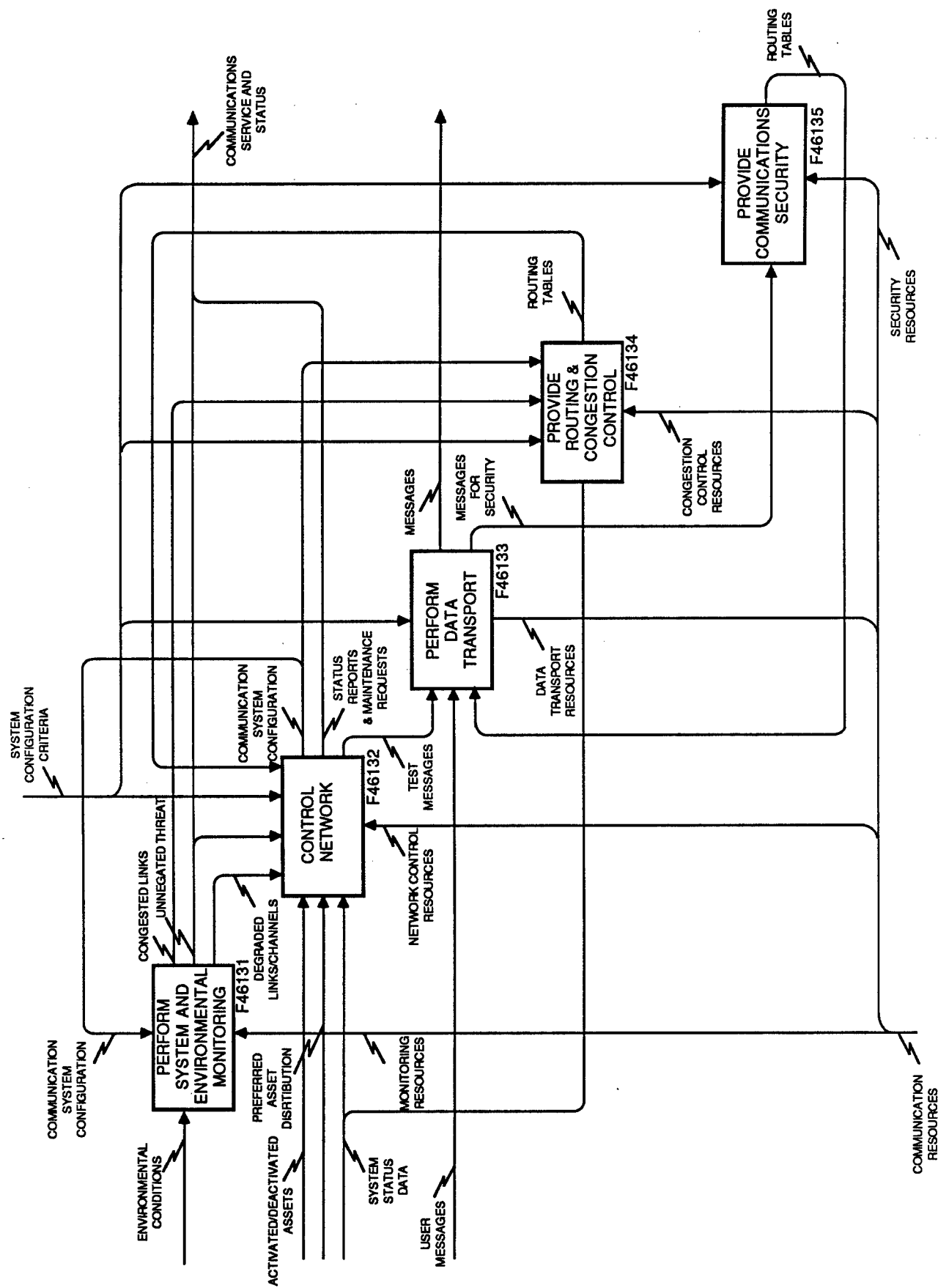


NODE: F46
TITLE: MAINTAIN SYSTEM CAPABILITY



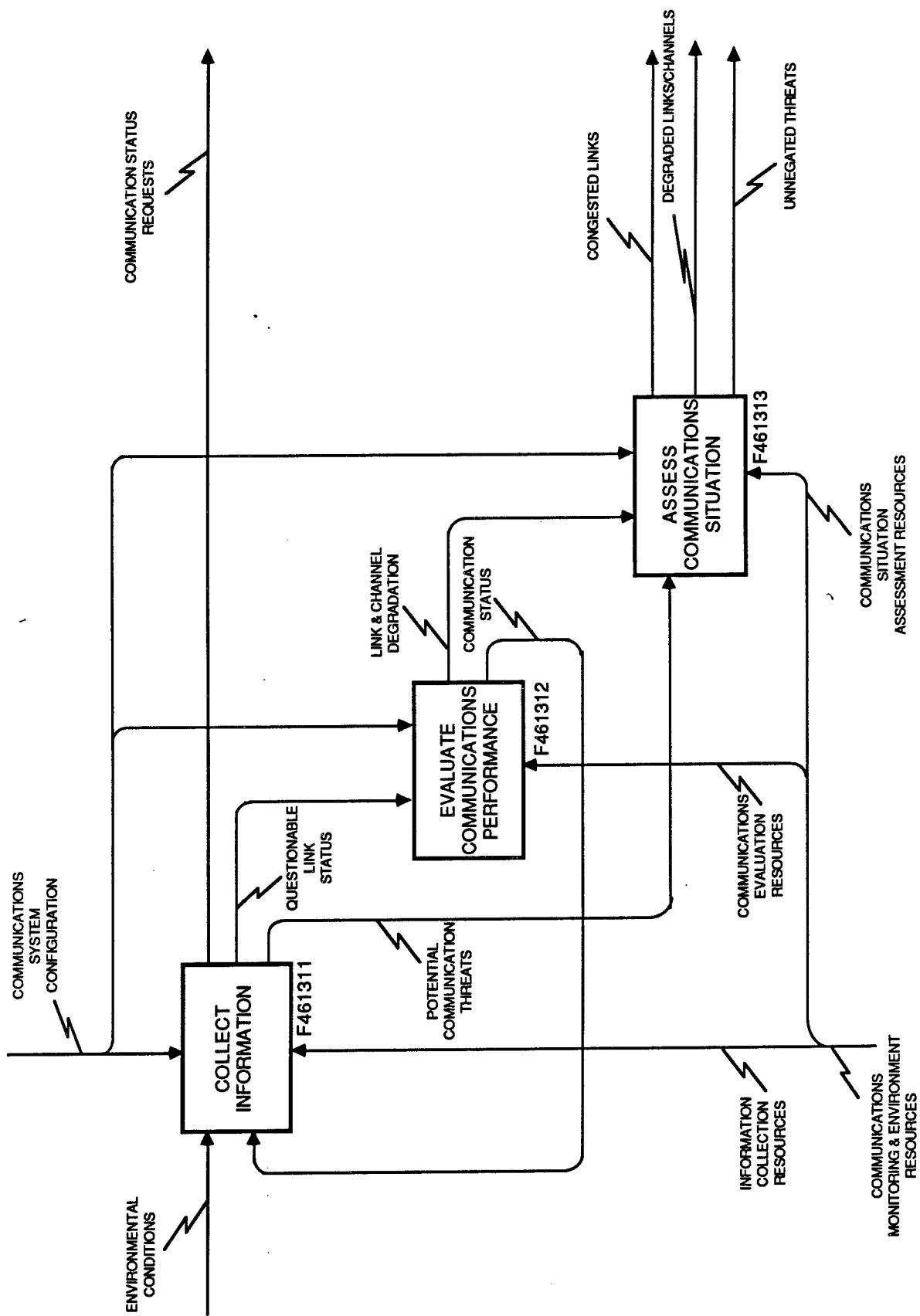
NODE: F461

TITLE: MANAGE SYSTEM OPERATIONAL CONFIGURATION

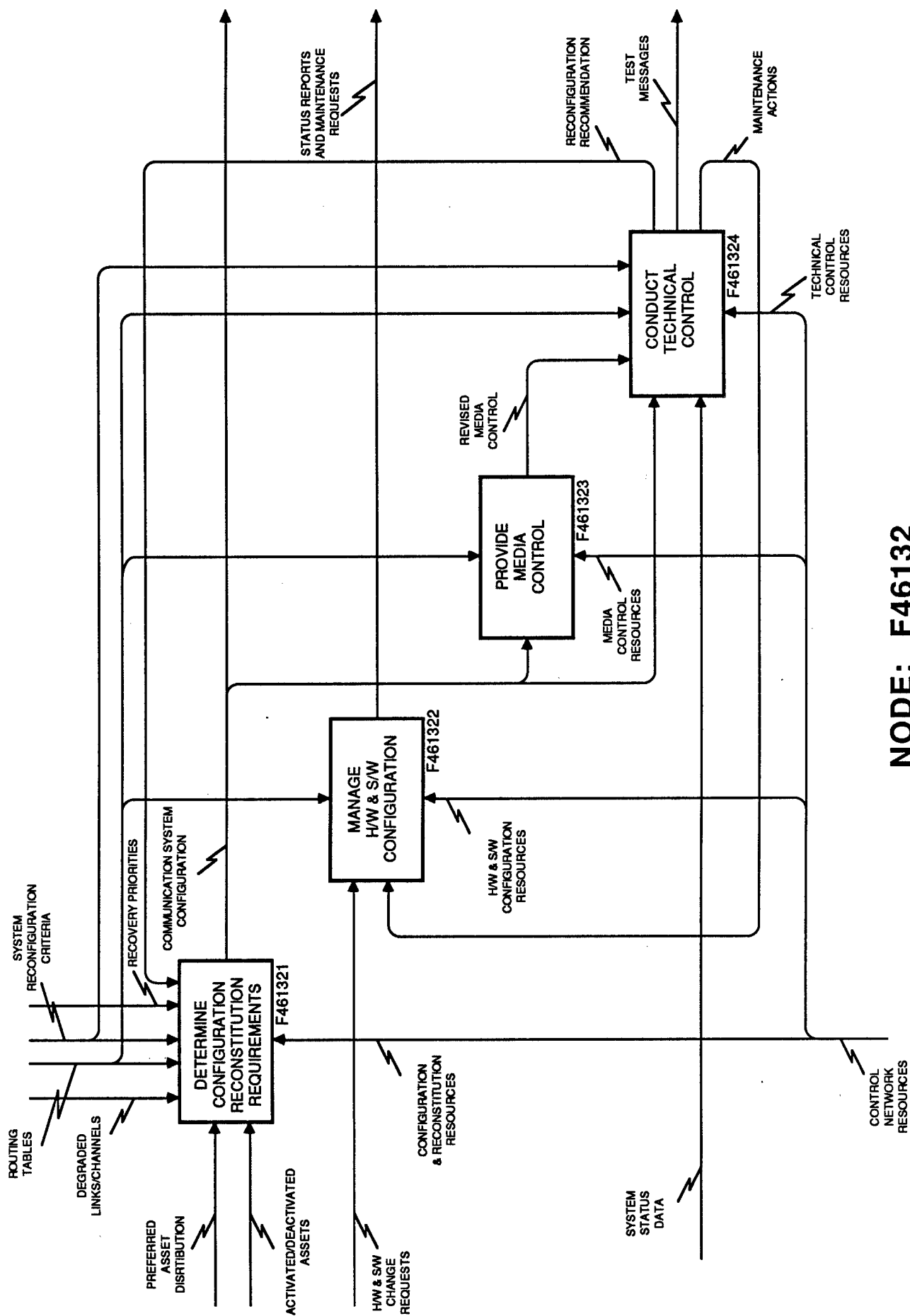


NODE: F4613

TITLE: PROVIDE COMMUNICATIONS CONNECTIVITY & SERVICE

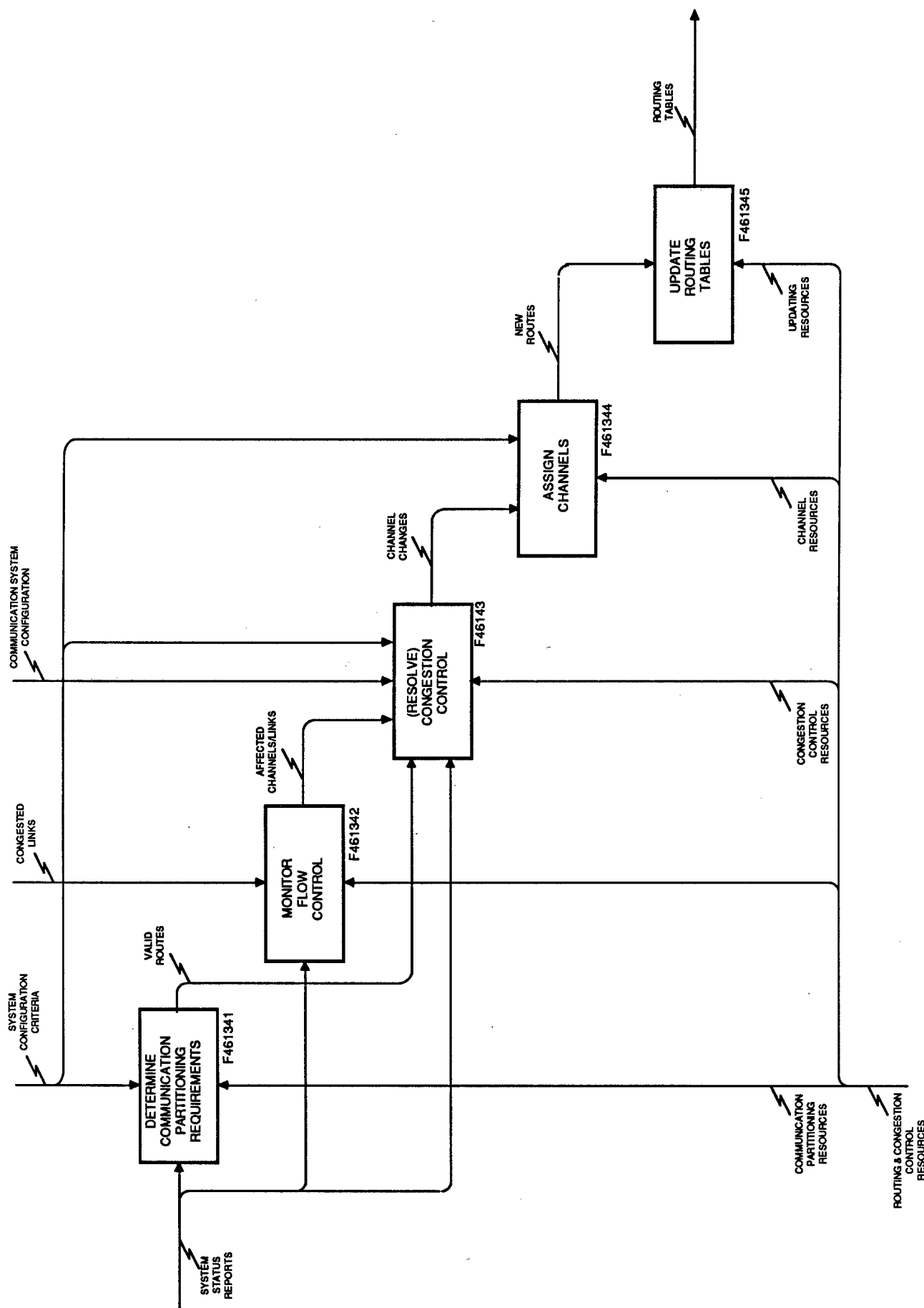


NODE: F46131
TITLE: PERFORM SYSTEM AND ENVIRONMENT MONITORING

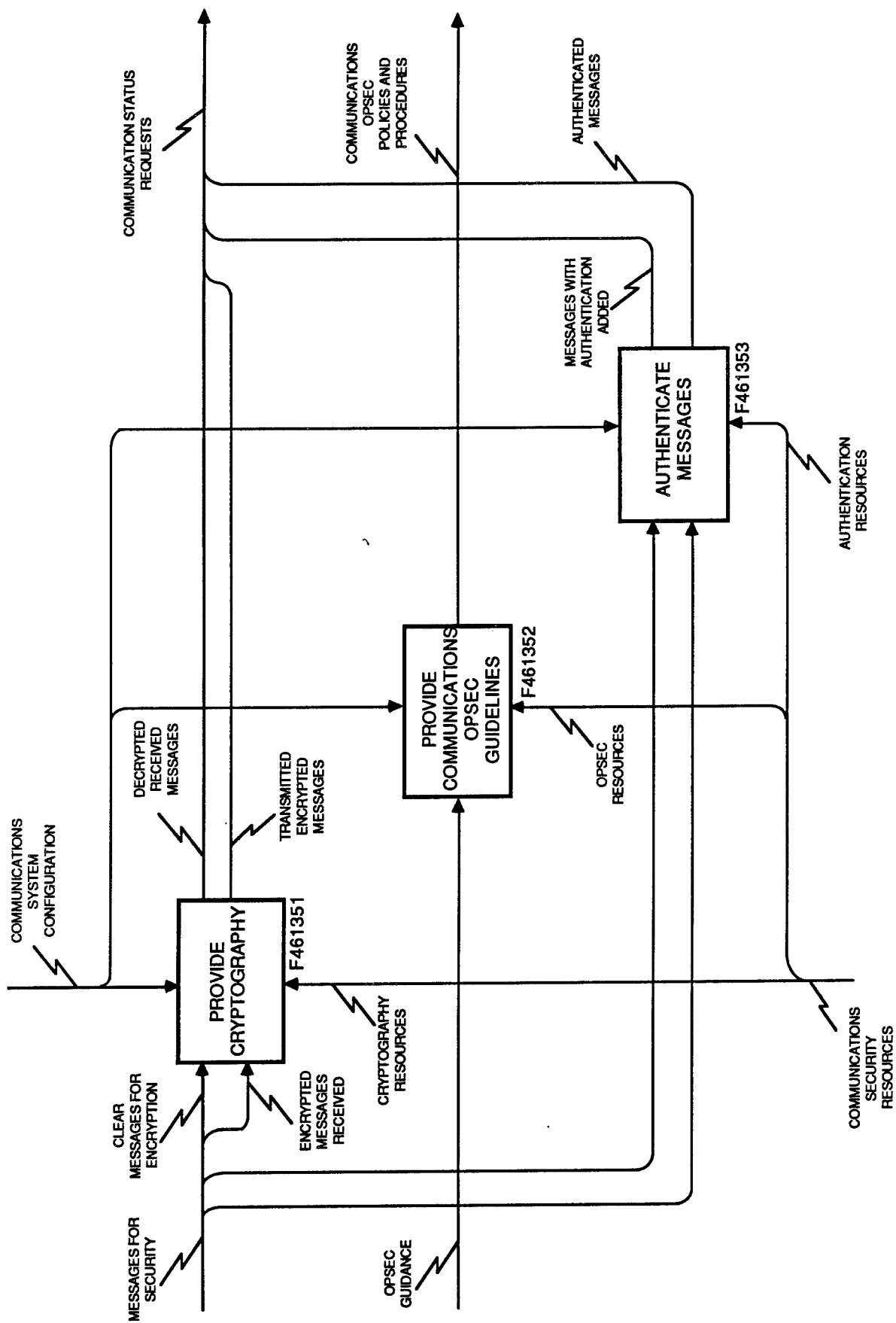


NODE: F46132
TITLE: CONTROL NETWORK



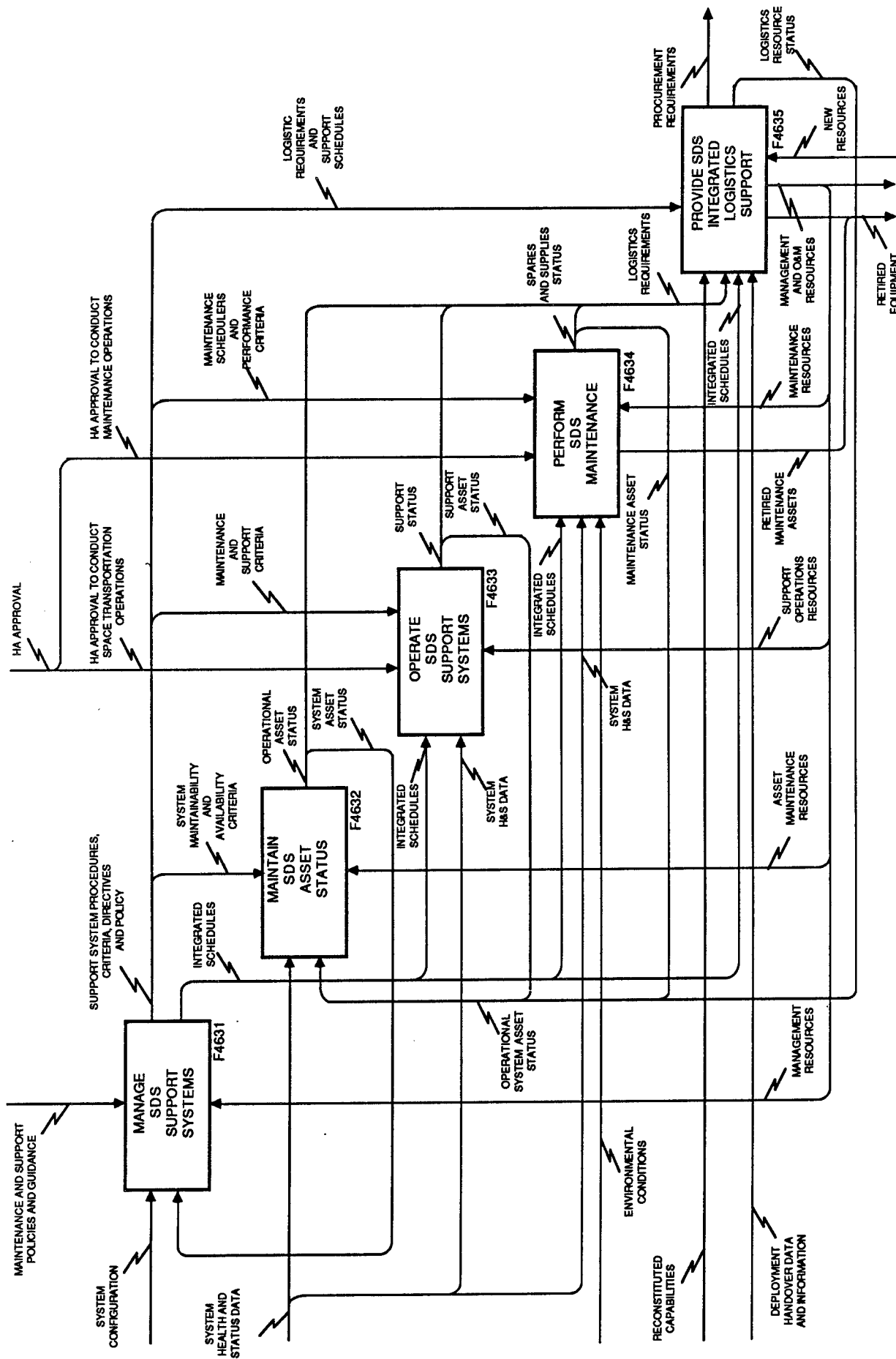


NODE: F46134
TITLE: PROVIDE ROUTING AND CONGESTION CONTROL

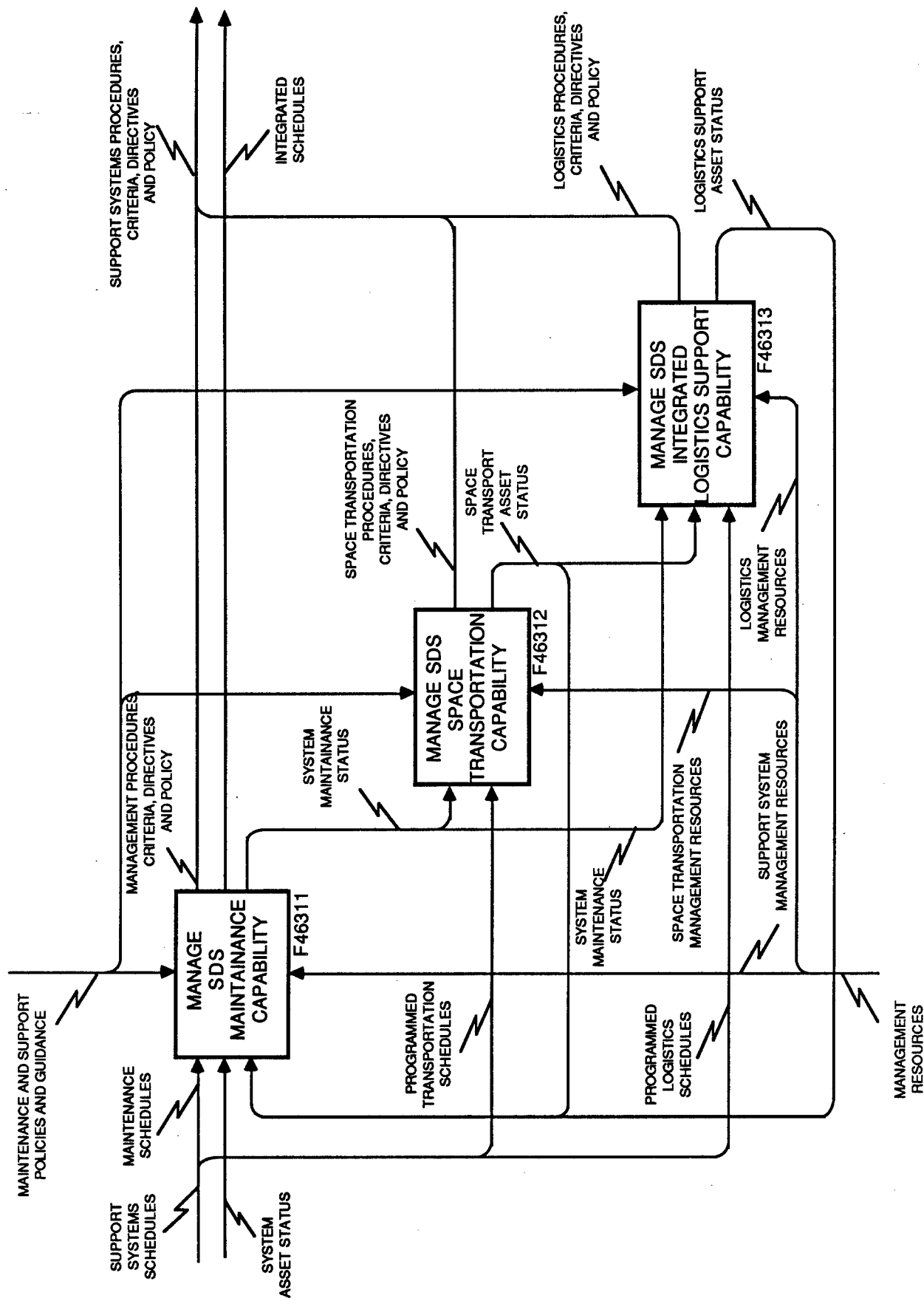


NODE: F46135
TITLE: PROVIDE COMMUNICATION SECURITY

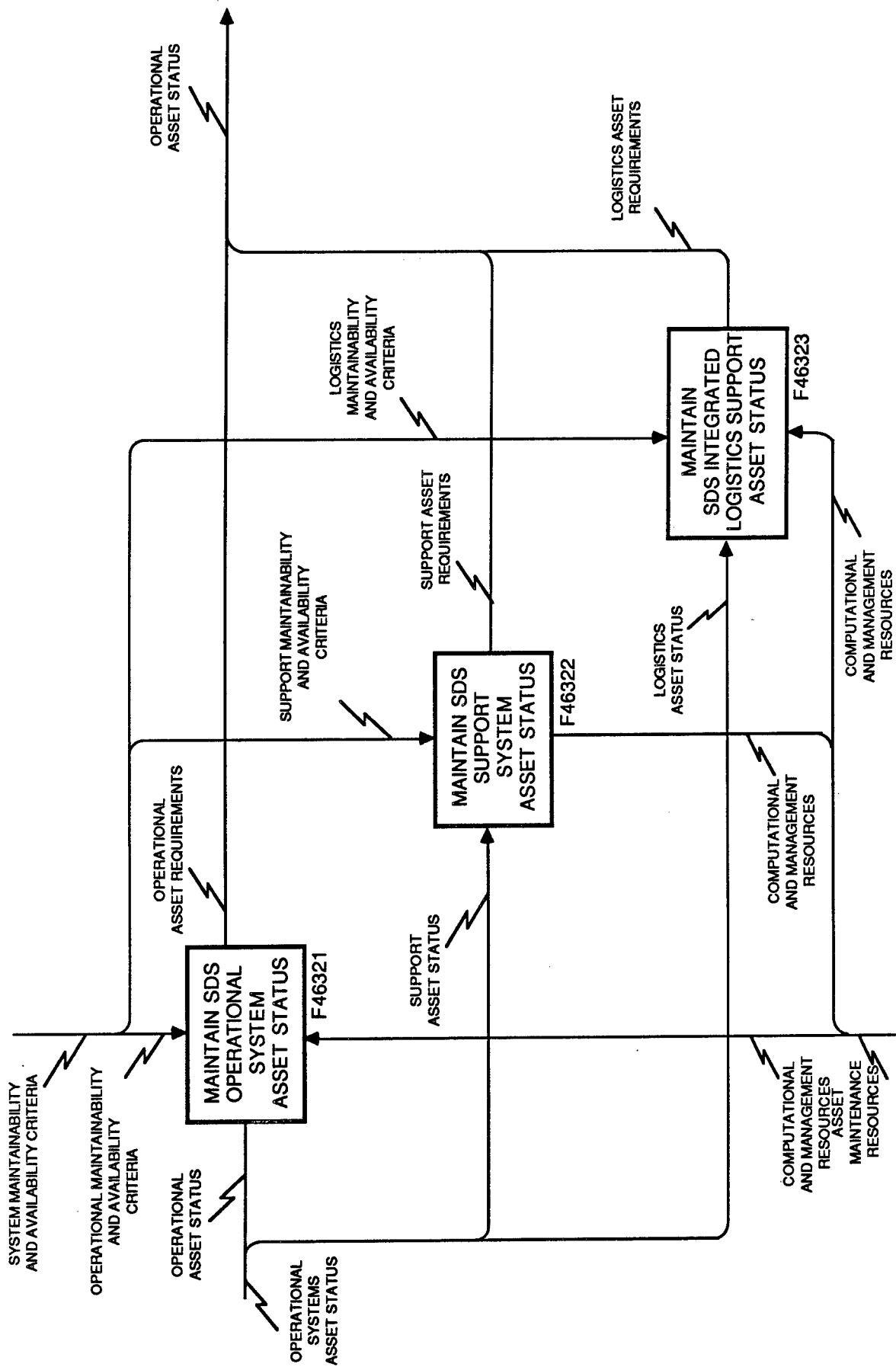




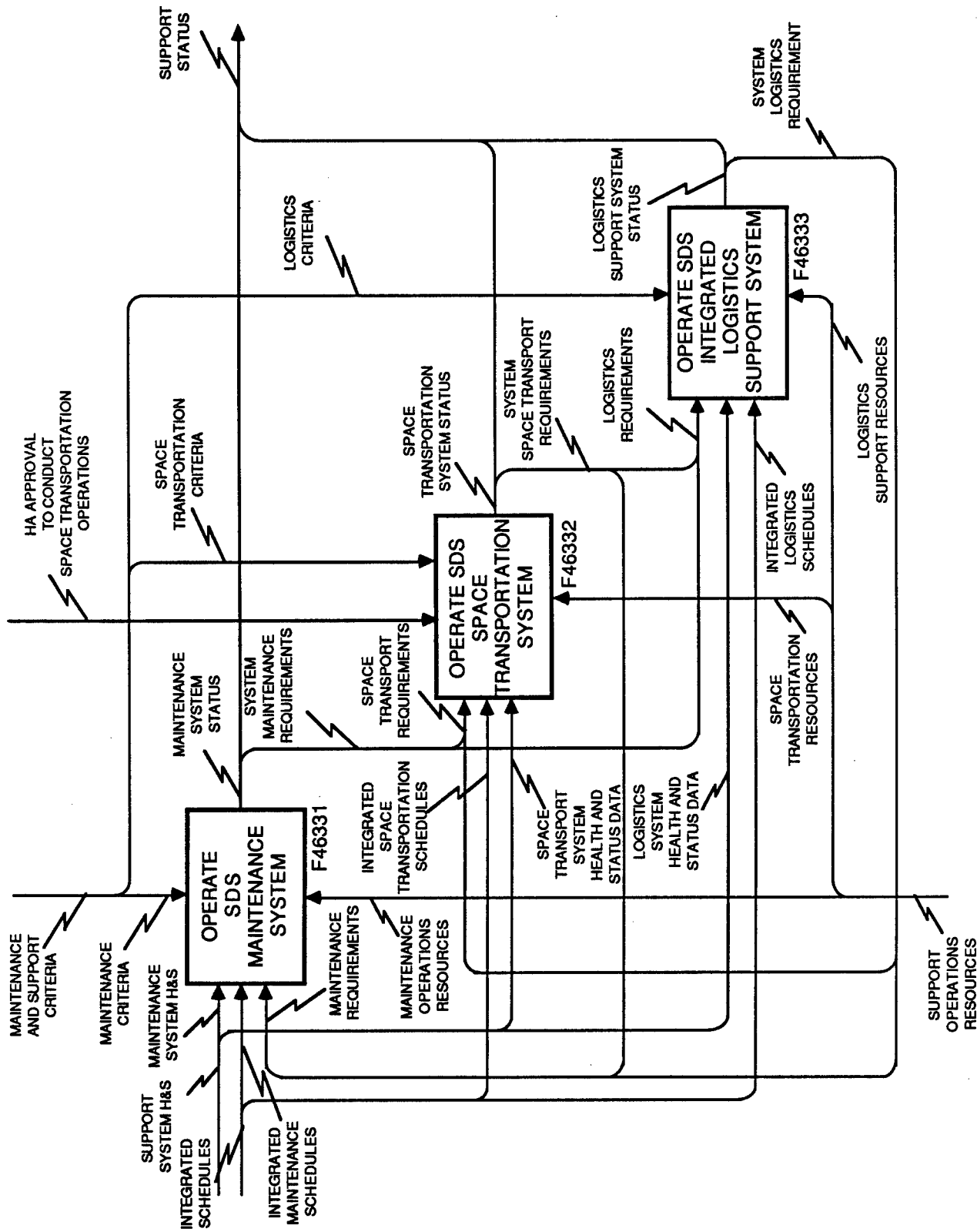
NODE: F463
TITLE: SDS MAINTAIN AND SUPPORT THE SYSTEM



NODE: F4631
TITLE: MANAGE SDS SUPPORT SYSTEMS

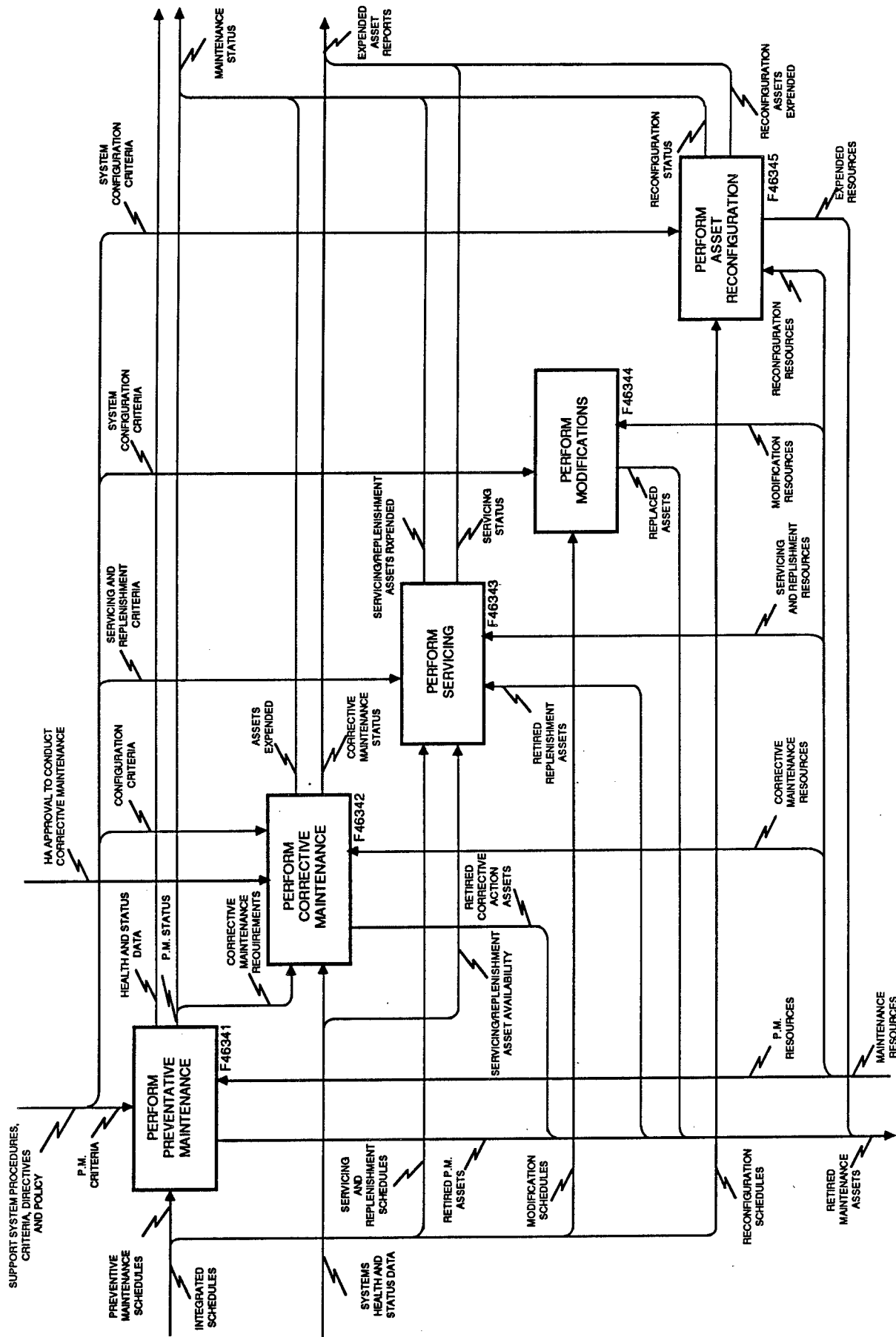


NODE: F4632
TITLE: MAINTAIN SDS ASSET STATUS

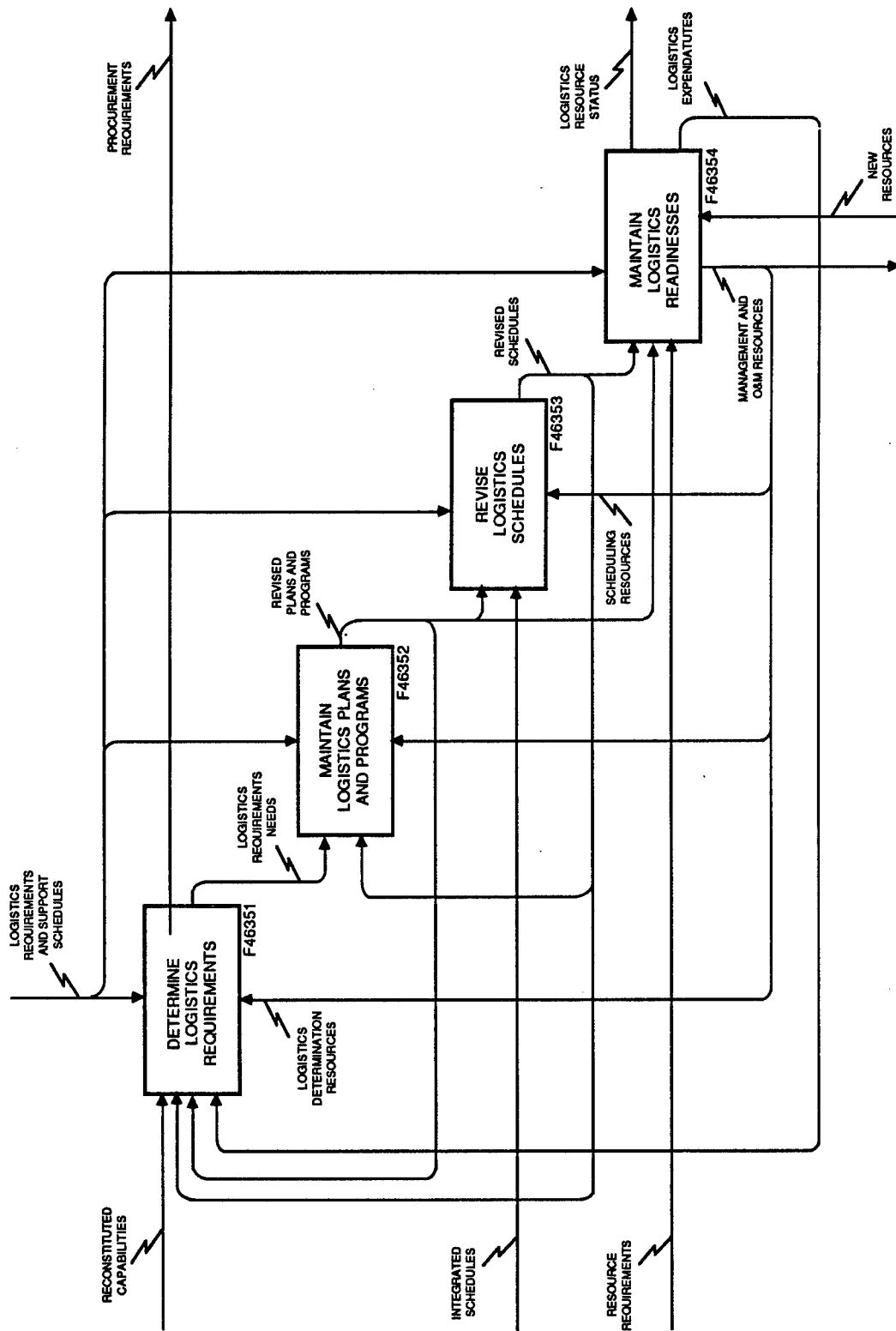


NODE: F4633

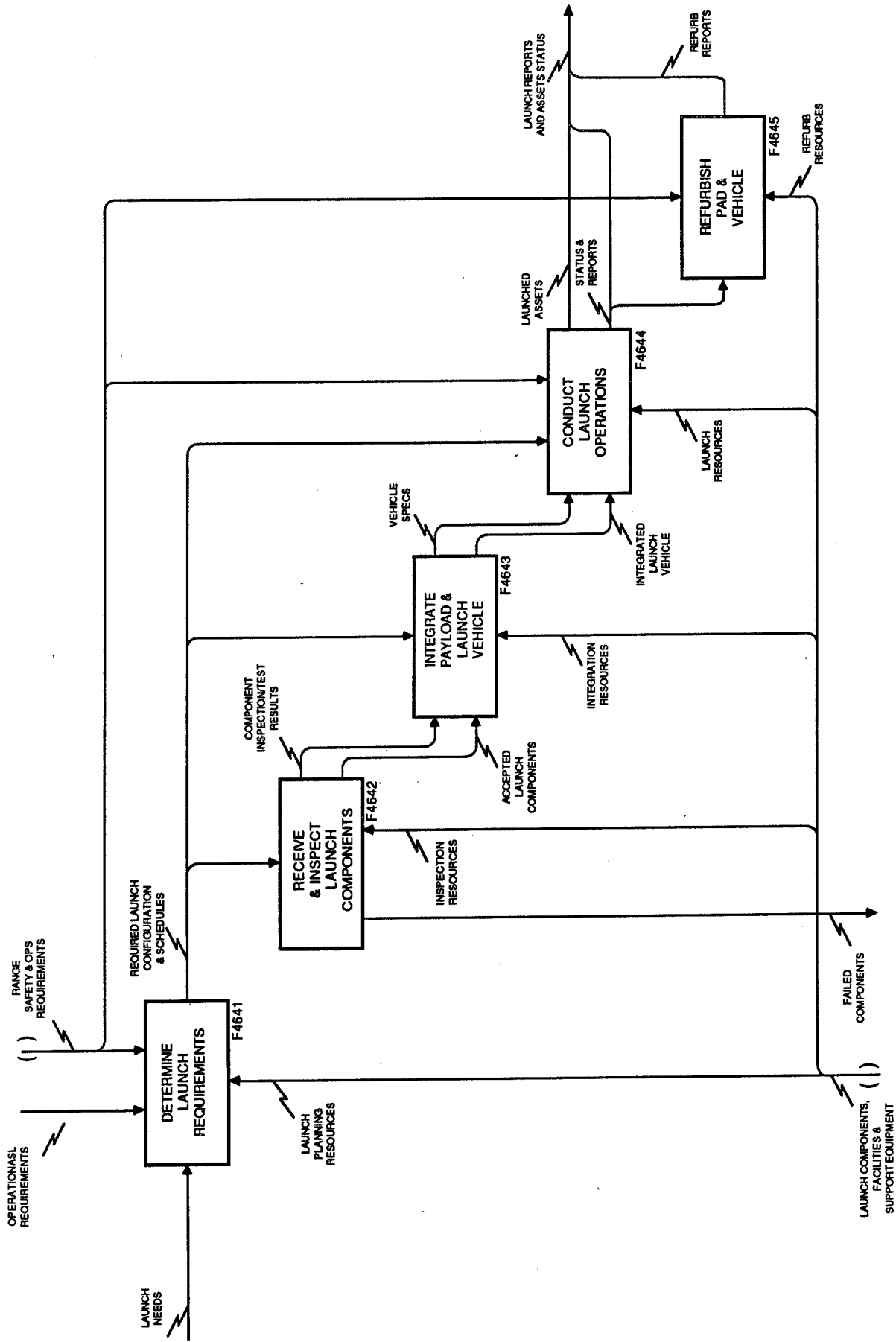
TITLE: OPERATE SDS SUPPORT SYSTEMS



NODE: F4634
TITLE: PERFORM SDS MAINTENANCE



NODE: F4635
TITLE: PROVIDE INTEGRATED LOGISTIC SUPPORT



NODE: F464
TITLE: PROVIDE LAUNCH ASSETS

SECTION II
FUNCTIONAL DESCRIPTIONS,
REQUIREMENTS AND IN/OUTPUT

INTRODUCTION TO SECTION II

This section is provides a generic description of each of the Strategic Defense System functions. Rockwell chose to use the structured functional model numbering system specified in the Integrated Computer Aided Manufacturing (ICAM) Program. This particular number sequence has provided Rockwell the vehicle to: (1) show the relationship among functions and requirements, (2) group functions into general categories i.e. Command and Control, Battle Management, etc., (3) show relationships of functions to requirements, and (4) provide the means to trace a requirement back to its governing function. A description of the format used in this document is provided below.

| INPUT (A listing of Inputs, Controls and Mechanisms operating on this function) | (Function Number- Function Title) F41 - CONTROL THE SYSTEM Description: (A general description of the purpose of the function) <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> Number F41-1 </div> <div style="text-align: center;"> Requirement Description (A description of a requirement derived from this function) (The first requirement derived from this function) </div> </div> | OUTPUT (A listing of Outputs Controls and Mechanisms resulting from the operations of this function) |
|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|

Note: The traceability of inputs/outputs to functions is not specified in this document. This traceability was not accomplished during this effort, but a suggested numbering traceability sequence is provided below.

- Data/Information Input F41- DI 2 - First Data Input to function F41 • Control Output F41-CO3 - Second Control Output from F42
- Control Input F41- CI 3 - Third Control Input to F41 • Data/Information Output F41-DO5 - Fifth Data Output from F41
- Mechanism Input F41- MI 3 - Third Mechanism Input to F41 • Mechanism Output F41-MO1 - First Mechanism Output from F41

STRATEGIC DEFENSE SYSTEM
FUNCTIONAL DESCRIPTIONS
REQUIREMENTS AND INPUT/OUT
(THE STRATEGIC DEFENSE SYSTEM)

INPUT

- 1) National Security Policy
- 2) Military Strategy
- 3) SDS Missions
- 4) Direction And Guidance From Higher Authority
- 5) Decisions To Develop And Deploy The SDS
- 6) Decision To Decommission The SDS
- 7) Intelligence Information
- 8) Friendly Force Information
- 9) Ballistic Missile And Defense Suppression Threats
- 10) Environment

FO - PROVIDE STRATEGIC BALLISTIC MISSILE DEFENSE

Description: This highest level function encompasses all activities, processes, and means to provide active strategic ballistic missile defense of the United States and its Allies. It includes the high level functions of developing the Strategic Defense System (SDS), producing the SDS, deploying the SDS, employing the SDS, and, when appropriate, decommissioning the SDS.

Requirement Description

- | | |
|------|-------------------------------|
| F0-1 | SDS Development Resources |
| F0-2 | SDS Production Resources |
| F0-3 | SDS Deployment Resources |
| F0-4 | SDS Employment Resource |
| F0-5 | SDS Decommissioning Resources |

OUTPUT

- 1) Satisfaction Of National Security Policy And Military Strategy Requirements In The Strategic Ballistic Missile Defense Mission Area
- 2) Support Of Collateral And External Mission Areas

**STRATEGIC DEFENSE SYSTEM
FUNCTIONAL DESCRIPTIONS
REQUIREMENTS AND INPUT/OUTPUT
(DEPLOYMENT)**

INPUT

- 1) Declaration Of SDS Milestone III
- 2) Policy, Missions, And Direction From HA
- 3) Plans & Schedules
- 4) Threat Objects And Events
- 5) Facilities and Technical Designs
- 6) SDS Deployment Resources
- 7) Intel/Friendly Force Reports
- 8) Environments

F3 - DEPLOY SDS

Description: This function encompasses all the activities of the deployment phase of the SDS to include the acceptance and evaluation of resources from manufactures/vendors; the testing of systems and components prior to integration into larger sections of the SDS; the integration of systems into elements and the integration of elements into the overall SDS. This function encompasses the maintenance of SDS configuration plans, changes to these plans, the evaluation of and testing of sds standards, concepts, policies, etc. which will eventually be integrated into the SDS and the training of personnel which will be responsible for operating, maintaining and supporting the SDS.

Requirement Description

- | | |
|------|-----------------------------------|
| F3-1 | Deployment Assets |
| F3-2 | Deployment Self Defense Policy |
| F3-3 | Deployment Facilities |
| F3-4 | Training Facilities and Standards |
| F3-5 | Deployment Standards and Policies |
| F3-6 | System Configuration Controls |
| F3-7 | Self Defense Assets |
| F3-8 | Manufacturing Schedules |

OUTPUT

- 1) Recommendations To HA
- 2) Changes & Reports
- 3) Impact Assessment Data
- 4) Operational Readiness Status
- 5) Warning & Assessment Reports
- 6) Battle Losses & Expenditures
- 7) System Handover To SDS
- 8) Self Defense System Status
- 9) Residual Threat

INPUT

- 1) Policy Mission Rules & Direction From HA
- 2) OPlans & Procedures
- 3) External Environment Including The Enemy Defense Suppression Threat (Postulated For Planning And Actual For Operations)
- 4) Resources Required To Perform The Protection - Initially Including SPACETRACK, SPADOR, ALASAT, INTEL, And Other External Applicable Assets.
- 5) Schedules & Revisions
- 6) Intelligence & Warning Information To Include Satus Of Friendly Forces
- 7) Declaration Of MS III
- 8) Threat Object & Events

F31 - PROVIDE SDS DEPLOYMENT PROTECTION

Description: This function encompasses the planning and operation of the command and control, surveillance, situation assessment, defensive response selection, and defensive response execution activities required for the protection of the SDS beginning with deployment of the initial SDS asset and concluding with the final validation of SDS Initial Operational Capability (IOC). For those SDS protection activities required which must be performed externally to the SDS, this function will provide the planning, command and control, situation assessment, and operational tasking for those external activities.

| # | Requirement Description |
|-------|-----------------------------------------|
| F31-1 | Command And Control The Defense |
| F31-2 | Conduct Surveillance And Discrimination |
| F31-3 | Monitor And Asses The Situation |
| F31-4 | Select The Defensive Response |
| F31-5 | Execute The Defensive Response |
| F31-6 | Maintain System Capability |

OUTPUT

- 1) Recommended Actions To Higher Authority (Depending On Roes For Applicable IOC)
- 2) Warning And Assessment Reports To Higher Authority
- 3) Battle Losses And Protection Resource Expenditures
- 4) Self Defense System Status
- 5) Residual Threats

INPUT

- 1) Mission Requirements From The JCS And Real-Time Direction From Higher Authority (NCA)
- 2) Approved OPlans And Procedures
- 3) Situation Data Including The Defense Suppression Threat
- 4) C2 Resources; Including Defense Commander, Command Center Personnel & Facilities, And C2 Planning Personnel And Facilities
- 5) Declaration Of MS III
- 6) Strategy Selection
- 7) SDS Deployment Schedules & Revisions

F311 - COMMAND AND CONTROL THE DEFENSE

Description: This function includes the activities required for command and control of the SDS deployment protection which are principally those activities of guidance and direction which require centralized and positive control, or those activities which must interface with applicable external functions. This function does not include those activities required for battle management, detailed tasking, and fire control which have been delegated to other F31 functions. Initially some efforts required for this function may be delegated to the space defense operations center (SPADOC) until sufficient SDS assets are deployed to perform this function within the SDS.

Requirement Description

- F311-1 Exercise Command (I.E. Exercise Executive Command Over The Other C2 Functions; eg Establish C2 Procedures And Choose Battle Operation)
- F311-2 Preplan And Test Command And Control
- F311-3 Provide Positive Control (I.E. Activities Of Defense Command Center Personnel; eg To Assess Situation And Develop Alternatives)
- F311-4 Provide Management Control (eg Generate Weapons Release, Surveillance Criteria, Develop Integrated Battle Timeline, And Delegate Defensive Response Authority To Other F31x Functions)

OUTPUT

- 1) Recommendations To HA
 - NCA (Eg. Real-Time Chosen Battle Option)
 - CINC (Eg. Non-Real-Time Changes To OPlans And ROEs)
- 2) Defense Command & management Guidance
 - S&D Criteria
 - Decision Aids & Procedures
 - ROEs & Defense Preferences
 - Strategy Selection Overrides
 - System Mode Selection
 - System Management Guidance

| INPUT | F312 - CONDUCT SURVEILLANCE AND DISCRIMINATION (S&D) | OUTPUT | | | | | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------|--------|------------------------------------------------------|--------|----------------------------------------------------------|--------|-----------------------------------------------------------------------|--------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>1) Situation Data<ul style="list-style-type: none">- Information From External Contributing Surveillance Assets (SPACETRACK, ITW & KA System, INTEL)- Information From External Contributing Object/Event Identification And Classification Assets (SPADPC And INTEL)</div> <div>2) Environment Background</div> <div>3) Surveillance And Discrimination (S&D) Criteria</div> <div>4) Object/Event Observables</div> <div>5) Surveillance And Discrimination Resources (SDS Sensors, Personnel And Facilities As They Are Deployed)</div> | <div>Description: This function includes those activities required to manage S&D asset tasking, collect and process surveillance and discrimination data, initiate and maintain potential defense suppression threat data files, and classify and identify objects and events. Initially some efforts required for this function may be delegated to the spacetrack system (for cold body surveillance), the integrated tactical warning and attack assessment (ITW&AA) system (for space launch detection) and the space defense operations center (SPADOC) (for object and event identification and classification).</div> <div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F312-1</td><td>Manage Surveillance And Discrimination Asset Tasking</td></tr><tr><td>F312-2</td><td>Collect And Process Surveillance And Discrimination Data</td></tr><tr><td>F312-3</td><td>Initiate And Maintain Potential Defense Suppression Threat Data Files</td></tr><tr><td>F312-4</td><td>Classify And Identify Objects And Events</td></tr></table></div> | # | Requirement Description | F312-1 | Manage Surveillance And Discrimination Asset Tasking | F312-2 | Collect And Process Surveillance And Discrimination Data | F312-3 | Initiate And Maintain Potential Defense Suppression Threat Data Files | F312-4 | Classify And Identify Objects And Events | <div>1) Object And Event Data To Target Track Files</div> <div>2) Surveillance And Discrimination (S&D) Activities To Include S&D Expenditures</div> |
| # | Requirement Description | | | | | | | | | | | |
| F312-1 | Manage Surveillance And Discrimination Asset Tasking | | | | | | | | | | | |
| F312-2 | Collect And Process Surveillance And Discrimination Data | | | | | | | | | | | |
| F312-3 | Initiate And Maintain Potential Defense Suppression Threat Data Files | | | | | | | | | | | |
| F312-4 | Classify And Identify Objects And Events | | | | | | | | | | | |

INPUT

- 1) External Intelligence Reports
 - Information From Cooperating External Monitor And Assessment Assets (SPADOC)
 - Monitor And Assessment Resources (Personnel And Facilities)
- 2) Decision Aids & procedures
- 3) Battle Data
 - S&D Activities
 - Defense Activities
 - OPlans
- 4) Environmental Reports
- 5) Object/Event Data
- 6) Assessment Resources

OUTPUT

- 1) Battle Situation Assessment Data
 - Situation Data
 - Warning & Assessment Report

F313 - MONITOR AND ASSESS SITUATION

Description: This function includes those activities required to assess the defense suppression threat force status, determine attack initiation, determine the SDS assets at risk, evaluate the battle situation, and determine the defended SDS assets status. Initially, some efforts required for this function may be delegated to SPADOC (for attacks against SDS space assets) until sufficient SDS assets are deployed to perform this function within the SDS. some other efforts are required for this function may be delegated to external security assets responsible for the security maintenance for the ground locations where SDS assets are deployed.

Requirement Description

- | | |
|--------|-------------------------------------|
| F313-1 | Assess Threat Force Status |
| F313-2 | Determine Attack Initiation |
| F313-3 | Determine SDS Assets At Risk |
| F313-4 | Evaluate Battle Situation |
| F313-5 | Determine Defended SDS Asset Status |

INPUT

- 1) Roe's & Defense Preferences; Strategy Selection Override (And Battle Option Selection In Some Circumstances)
- 2) Situation Data
- 3) Target Track File Data
- 4) Response Selection Resources (Personnel And Facilities)

F314 - SELECT DEFENSIVE RESPONSE

Description: This function includes the activities required to identify roe imposed constraints, selected the defensive tactics and countermeasures, and specify response parameters. Initially, some efforts required for this function may be delegated to SPADOC (for attacks against SDS space assets until sufficient sds assets are deployed to perform this function within the SDS.

Requirement Description

- F314-1 Identify ROE Imposed Constraints
- F314-2 Select Defensive Tactics And Countermeasures
- F314-3 Specify Response Parameters

OUTPUT

- 1) Strategy & Tactics Selection
 - Response Parameters To Function F315
 - Strategy Selection
- 2) Response Parameters

INPUT

- 1) Response Parameters
- 2) Situation Data
- 3) Track File
- 4) Threat Object/Event Data
- 5) Defense Resources (Personnel And Facilities)
- 6) System Mode Selection

F315 - EXECUTE DEFENSIVE RESPONSE

Description: This function includes the activities required to assign threat target values and allocate threat targets for engagement (for large attacks), assign assets for engagement against the threat targets, engage the threats, and employ defensive countermeasures. Initially, some of these activities may be delegated to external cooperating assets until sufficient SDS assets are deployed to perform this function within the SDS.

Requirement Description

- F315-1 Assign Threat Target Values
- F315-2 Allocate Threat Targets For Engagement
- F315-3 Assign Assets For Engagement
- F315-4 Engage Threats
- F315-5 Employ Defensive Countermeasures

OUTPUT

- 1) Defense Activities
 - Losses & Expenditures
- 2) Residual Threat
 - Hostile Threats

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INPUT

- 1) Original Plans & Schedules
- 2) Element/Asset Status
- 3) Integrated Test Status
- 4) HA Policy & Guidance
 - Deficiency Reports
 - Incident Reports
 - Program Management Directive
 - Advance Study Notice
 - Operations Planning Guidance
 - Change Status
 - Higher Authority Feedback/Approval
 - Mission Requirements
- 5) Declaration Of MS III
- 6) I & D Report

F32 - REVISE & MAINTAIN PROGRAM MASTER PLAN

Description: This function encompasses those activities to maintain and revise the Program Master Plan and supporting plan that guide deployment activities. These activities include the identification and assessment of changes, development and evaluation of options, review and approval of changes, and direction and implementation of approved changes.

| # | Requirement Description |
|-------|----------------------------------------|
| F32-1 | Management Information System |
| F32-2 | SDS Operations Planning Support System |
| F32-3 | Analytical Tools |
| F32-4 | National Test Bed |

OUTPUT

- 1) Oplan Revisions
- 2) PMP TEMP & Changes
- 3) Recommended Changes & Reports
- 4) Impact Assessment
- 5) Schedules & Revisions

INPUT

- 1) Change Resources
- 2) Original OPlans & Schedules
 - PMP TEMP & Changes
 - Transition/Turnover Plan (T/TI)
 - Program Management Directive
 - Program Status Reports
 - Integrated Logistics Support Plan
 - Advance Study Notice
 - Draft Operations Plans
 - Operations Planning Guidance
- 3) Plan Change Status
- 4) I & D Reports
- 5) HA Policy & Guidance
- 6) Changes To OPlans & Procedures
- 7) Element/Asset Status
- 8) Integrated Test Status
- 9) Milestone III

F321 - IDENTIFY CHANGES

Description: This Function Encompasses Activities To Identify Changes To The Program Master Plan And Supporting Plans. These Activities Include Monitoring Status, Program Decision Memoranda And Program Change Directives To Detect Items That May Conflict With Current Plan.

#

Requirement Description

F321-1

- Management Information System
- Word Processing/Report Generation
 - Scheduling
 - Budgeting
 - Configuration Management
 - Requirements Traceability

OUTPUT

- 1) Conflict Reports
- 2) PMP TEMP & Changes

INPUT

- 1) Conflict Reports
- 2) Feasible Objective Options
- 3) Impact Resources

F322 - EVALUATE/ASSESS IMPACT

Description: This function encompasses those activities to determine the impact of any detected deviations from the approved plans. These activities include determining the impact and extent upon schedules, budgets, responsibilities, requirements.

| # | Requirement Description |
|---------|--------------------------------------------------------------------------------------------------------------------|
| F322-1 | M/S |
| F322-2 | SDS Operations Planning Support System |
| F322-3 | Analytical Tools <ul style="list-style-type: none">-Modeling-Simulation-War Gaming |
| F3422-4 | National Test Bed |

OUTPUT

- 1) Impact Assessments
- 2) Impacts

INPUT

- 1) Impact Assessment
- 2) Mission Requirements
- 3) PMP TEMP & Changes
- 4) Eval/Sel Options Resources

F323 - SELECT OPTIONS

Description: This function encompasses those activities involved in developing and evaluating options and selecting a preferred option for implementing an identified change. These activities include identifying, defining, evaluating, ranking and recommending alternatives.

| # | Requirement Description |
|---|-------------------------|
|---|-------------------------|

| | |
|--------|-----|
| F323-1 | M/S |
|--------|-----|

| | |
|--------|-----------------------------------------|
| F323-2 | SDS Operational Planning Support System |
|--------|-----------------------------------------|

| | |
|--------|------------------|
| F323-3 | Analytical Tools |
|--------|------------------|

| | |
|--------|-------------------|
| F323-4 | National Test Bed |
|--------|-------------------|

OUTPUT

- 1) Recommended Option
- 2) Feasible Objective Options

INPUT

- 1) Recommended Option
- 2) Higher Authority Comment/Feedback
- 3) Ha Approval
- 4) Gain Approval Resources

F324 - GAIN APPROVAL

Description: This function encompasses those activities involved in obtaining approval required for implementation of a change. these activities include the distribution, coordination and approval of change documentation.

| # | Requirement Description |
|--------|-------------------------|
| F324-1 | None |

OUTPUT

- 1) Recommendation Changes & Reports To HA
- 2) Program Change Directive

INPUT

- 1) Program Change Directive
- 2) Change Resources

F325 - IMPLEMENT CHANGE

Description: This function encompasses those activities involved in implementation of approved changes to the Program Master Plan. Activities in this function involve the preparation and distribution of approved program change directives and their incorporation in the PMP and ancillary/subordinate plans.

| # | Requirement Description |
|---|-------------------------|
|---|-------------------------|

| | |
|---------|-----|
| F3425-1 | M/S |
|---------|-----|

OUTPUT

- 1) Oplan Revision
- 2) Plan Change Status
- 3) PMP TEMP & Changes
- 4) Schedules & Revisions

INPUT

- 1) PMP TEMP & Changes
- 2) Facilities Design Technical Data
- 3) Asset Technical Data
- 4) Delivery System Technical Data
- 5) Schedules
- 6) Deployment Assets

F33 - DEPLOY ASSETS

Description: This function encompasses those activities involved in the delivery of assets to their operational location. These activities include preparation of launch and/or assembly and checkout of SDS assets, delivery to the operational location (i.e. orbit or ground site), and performing asset acceptance tests.

Requirement Description

- | | |
|--------|-------------------------------------------|
| F33-1 | M/S |
| F33-2 | A & E Plans & Specs |
| F33-3 | Real Estate & Facilities |
| F33-4 | Environmental Impact Statement Approval |
| F33-5 | Construction Resources |
| F33-6 | Facility Activation Plan |
| F33-7 | Facility Activation Task Force |
| F33-8 | Facility Acceptance Criteria |
| F33-9 | Quality Assurance Program |
| F33-10 | Special Tools & Test Equipment |
| F33-11 | Trained Personnel |
| F33-12 | Training Program & Equipment |
| F33-13 | Assembly Procedures & Acceptance Criteria |
| F33-14 | Safety Program |
| F33-15 | Inventory Management System |
| F33-16 | Delivery Systems (Surface, Air, Space) |
| F33-17 | Materials Handling Equipment |
| F33-18 | Delivery Procedures (Pack, Ship, Etc) |
| F33-19 | Prepared Operating Locations |
| F33-20 | Transportation Complexes |
| F33-21 | Asset Acceptance Criteria |
| F33-22 | Satellite Control Facilities |

OUTPUT

- 1) Acceptance Status & Data
- 2) Asset Status
- 3) I & D Reports

INPUT

- 1) Schedules
- 2) Facilities Design Technical Data
- 3) Facilities & Resources

F331 - PREPARE FACILITIES

Description: This function encompasses those activities to prepare and deliver facilities to be used to assemble, checkout and deliver SDS element assets to their operational locations. These activities include the construction, activation, checkout and acceptance of the facilities.

| # | Requirement Description |
|--------|-----------------------------------------|
| F331-1 | M/S |
| F331-2 | A&E Plans & Specifications |
| F331-3 | Real Estate & Facilities |
| F331-4 | Environmental Impact Statement Approval |
| F331-5 | Construction Resources |
| F331-6 | Facility Activation Plan |
| F331-7 | Facility Activation Task Force |
| F331-8 | Facility Acceptance Criteria |

OUTPUT

- 1) Facility Status
- 2) Facility As-Built Technical Data

INPUT

- 1) Facility Status
- 2) Facility As-Built Technical Data
- 3) PMP TEMP & Changes
- 4) Asset Technical Data
- 5) Assets & Checkout Resources

F332 - ASSEMBLE & CHECKOUT ASSETS

Description: This function encompasses those activities to assemble checkout and prepare SDS element assets for delivery to their operational locations. These activities include the receipt and inventory management of all necessary subsystems and piece parts, receipt and maintenance of engineering data and records, scheduling, assembly, inspection test and verification and status reporting of completed configuration items.

Requirement Description

- F332-1 Quality & Assurance Program
- F332-2 Special Tools & Test Equipment
- F332-3 Facilities
- F332-4 Trained Personnel
- F332-5 Training Program & Equipment
- F332-6 Assembly Procedures
- F332-7 Acceptance Criteria
- F332-8 Safety Program
- F332-9 M/S
- F332-10 Inventory Management System

OUTPUT

- 1) Assembly Status
- 2) Assembly Assets Status

INPUT

- 1) PMP TEMP & Changes
- 2) Deliverly System Technical Data
- 3) Deliverly Assets

F333 - PROVIDE DELIVERY SYSTEMS

Description: This function encompasses those activities that provide the systems to be used to deliver SDS element assets to their operational locations. These activities include scheduling, positioning, preparation of the delivery system prior to loading of the deliverable asset.

| # | Requirement Description |
|--------|---------------------------|
| F333-1 | M/S |
| F333-2 | Quality Assurance Program |
| F333-3 | Acceptance Criteria |
| F333-4 | Surface Delivery Systems |
| F333-5 | Airborne Delivery Systems |
| F333-6 | Space Delivery Systems |

OUTPUT

- 1) Deliverly System Status
- 2) Deliverly System as-Built Technical Data

INPUT

- 1) Assembly Status
- 2) Delivery System Status
- 3) Facility Status
- 4) Delivery System As-Built Technical Data
To Include Configuration Records
- 5) PMP TEMP & Changes
- 6) Delivery Resources

F334 - DELIVER ASSETS

Description: This function encompasses those activities involved in the transportation of SDS element assets to their operational location. These activities include the packing, loading, moving, unloading and unpacking of the asset. Also included are activities of scheduling, quality assurance and status reporting.

Requirement Description

- F334-1 M/S
- F334-2 Materials Handling Equipment
- F334-3 Packing/Shipping Procedures & Standards
- F334-4 Quality Assurance Program
- F334-5 Prepared Operating Location
- F334-6 Transportation Complex
 - Surface
 - Space
 - Air
- F334-7 Trained Transportation Personnel

OUTPUT

- 1) Delivery System Status
- 2) Assets & Resources

INPUT

- 1) Delivery System Status And Configuration Records
- 2) PMP TEMP & Changes
- 3) Assets and Resources
- 4) Performance Assets

F335 - PERFORM ASSET ACCEPTANCE TEST

Description: This function encompasses those activities to conduct tests to determine acceptability of delivered SDS element assets. These activities include maintenance of test procedures, performing tests, collection and evaluation of acceptance data, and reporting of test results and status.

| # | Required Description |
|--------|---------------------------|
| F335-1 | Acceptance Criteria |
| F335-2 | Test Procedures Equipment |
| F335-3 | M/S |
| F335-4 | Element Control |
| F335-5 | Test Personnel |
| F335-6 | Quality Assurance |

OUTPUT

- 1) Acceptance Status And Data
- 2) I & D Reports

INPUT

- 1) PMP TEMP & Changes
- 2) Acceptance Data & Status
- 3) Asset Data
- 4) Connection Resources
- 5) Schedules

F34 - CONNECT SDS ELEMENT ASSETS

Description: This function encompasses those activities to incrementally integrate new assets into accepted SDS element configurations (e. g. constellations). These activities include the planning, coordination and reconfiguration of the element baseline, interconnecting the assets, and verifying element functional capability subsequent to insertion of the new asset.

| # | Requirement Description |
|--------|-------------------------------|
| F34-1 | Management Information System |
| F34-2 | Deployment Planning |
| F34-3 | Procedures & Test Equipment |
| F34-4 | Quality Assurance Program |
| F34-5 | Trained Personnel |
| F34-6 | Element Control Facilities |
| F34-7 | Interface Simulators |
| F34-8 | Analytical Tools |
| F34-9 | Comm Tech Control Facilities |
| F34-10 | Acceptance Criteria |

OUTPUT

- 1) Element Status & Data
- 2) Element Test Results & Configuration
- 3) I & D Reports

INPUT

- 1) PMP TEMP & Changes
- 2) Acceptance Data & Status
- 3) Schedules
- 4) Configuration Change Resources

F341 - COORDINATE ELEMENT CONFIGURATION CHANGE

Description: This function encompasses those activities to coordinate a change in an SDS element configuration covered by the introduction of an additional operating asses into the configuration. These activities include scheduling, configuration management and tasking of affected system and agencies

| # | Requirement Description |
|---|-------------------------|
|---|-------------------------|

| | |
|--------|-----|
| F341-1 | M/S |
|--------|-----|

| | |
|--------|-----------------|
| F341-2 | Deployment Plan |
|--------|-----------------|

OUTPUT

- 1) Reconfiguration Timeline
- 2) Element Re-Configuration Plan

INPUT

- 1) Reconfiguration Timeline
- 2) Reconfiguration Plan
- 3) Element Test Results & Configuration
- 4) Reconfigure Resources

F342 - RECONFIGURE ELEMENT BASELINE

Description: This function encompasses those activities to modify the configuration of a baseline SDS element to incorporate additional assets. These activities may include: velocities of already deployed assets, configuration of proper function and location, subsequent to relocation & retask in conjunction with relocation.

Requirement Description

- F342-1 Procedures & Test Equipment
- F342-2 Element Control Facilities
- F342-3 Trained Personnel
- F342-4 M/S
- F342-5 Quality Assurance
- F342-6 Comm Tech Control Facility

OUTPUT

- 1) Reconfiguration Status
- 2) Configuration Data

INPUT

- 1) Reconfiguration Status
- 2) Configuration Data
- 3) Asset Data
- 4) Acceptance Data/Status
- 5) Interconnect Asset Resources

F343 - INTERCONNECT ASSETS

Description: This function encompasses those activities to establish and verify connectivity among SDS element assets coincident with insertion of new assets into the baseline. The activities involve establishing communications links, verifying link function, tasking new asset and transferring operational control.

| # | Requirement Description |
|--------|-----------------------------------|
| F343-1 | Element Control Facilities |
| F343-2 | Procedures & Test Equipment |
| F343-3 | Quality Assurance |
| F343-4 | Comm Tech Control Facilities |
| F343-5 | Trained Personnel (Element Level) |

OUTPUT

- 1) Interconnect Status
- 2) Connection Data

INPUT

- 1) PMP TEMP & Changes
- 2) Interconnect Status
- 3) Connection Data
- 4) Configuration Data
- 5) Acceptance Data & Status
- 6) Verification Resources

F344 - VERIFY ELEMENT FUNCTIONAL CAPABILITY

Description: This function encompasses those activities to verify the integral functional of capability of the SDS element. these activities involve maintenance of procedures, performance of functional verification tests, collection and verification of data and report of test results and status.

Requirement Description

- | | |
|--------|----------------------------------|
| F344-1 | Procedures & Test Equipment |
| F344-2 | Quality Assurance |
| F344-3 | M/S |
| F344-4 | Acceptance Criteria |
| F344-5 | Travel Personnel (Element Level) |
| F344-6 | Element Control Facilities |
| F344-7 | Interface Simulators |
| F344-8 | Analytical Tools (Element Level) |
| | - Model |
| | - Simulators |

OUTPUT

- 1) Element Status & Data
- 2) Element Test Results & Configuration
- 3) I & D Reports

INPUT

- 1) Element Status & Data
- 2) Element Test Results & Configuration
- 3) PMP TEMP & Changes
- 4) Schedules
- 5) Test & Evaluation Resources

F35 - CONDUCT SYSTEM TEST AND EVALUATION

Description: This function encompasses those activities to enivertally integrate new elements into the accepted SDS system configuration. These activities include the planning, coordination and reconfiguration of the system baseline, interconnecting the elements, and verifying system functional capability subsequent to integration of the new element.

| # | Requirement Description |
|-------|--------------------------------|
| F35-1 | Management Information System |
| F35-2 | Integration Plans & Procedures |
| F35-3 | Element Control Facilities |
| F35-4 | Trained Personnel |
| F35-5 | Quality Assurance Program |
| F35-6 | System Control Facilities |
| F35-7 | Analytical Tools |
| F35-8 | Procedures & Test Equipment |
| F35-9 | Acceptance Criteria |

OUTPUT

- 1) System Test Results & Configuration
- 2) Integration Test Status & Results
- 3) I & D Reports
- 4) Validated Planning Factors

INPUT

- 1) Element Test Results & Configuration
- 2) Element Status & Data
- 3) PMP TEMP & Changes
- 4) Schedules
- 5) Coordination Resources

F351 - COORDINATE SYSTEM CONFIGURATION

Description: This function encompasses those activities to coordinate a change on the SDS system configuration caused by the introduction of an additional element into the baseline configuration. These activities include scheduling, configuration management and tasking of affected systems/agencies.

| # | Requirement Description |
|--------|---------------------------------|
| F351-1 | M/S |
| F351-2 | Coordinate System Configuration |

OUTPUT

- 1) System Reconfiguration Timeline
- 2) System Configuration Plan

INPUT

- 1) System Reconfiguration Timeline
- 2) System Configuration Plan
- 3) System Test Results & Configuration
- 4) Reconfigure Resources

F352 - RECONFIGURE SYSTEM BASELINE

Description: This function encompasses those activities to modify the configuration of the baseline SDS system to incorporate additional elements. These activities may involve: Installation and checkout of software releases, removal of test drivers/interface simulators, update of databases.

Requirement Description

| | |
|--------|---------------------------------|
| F352-1 | Procedures |
| F352-2 | Element Control Facilities |
| F352-3 | Trained Personnel |
| F352-4 | M/S |
| F352-5 | Quality Assurance |
| F352-6 | Comm Network Control Facilities |

OUTPUT

- 1) Reconfiguration Status
- 2) Configuration Data

INPUT

- 1) Reconfiguration Status
- 2) Configuration Data
- 3) Element Test Results & Configuration
- 4) Interconnect Resources

F353 - INTERCONNECT SYSTEM ELEMENTS

Description: This function encompasses those activities to establish and verify connectivity among SDS elements associated with the insertion of a new element into the baseline. The activities involve establishing communications links, verifying link functions, tasking new elements and transferring operational control.

| # | Requirement Descriptions |
|--------|----------------------------------|
| F353-1 | Element Control Facilities |
| F353-2 | Procedures & Test Equipment |
| F353-3 | Quality Assurance |
| F353-4 | Comm Network Control Facilities |
| F353-5 | Trained Personnel (System Level) |

OUTPUT

- 1) Interconnect Status
- 2) Connection Data

INPUT

- 1) PMP TEMP & Changes
- 2) Interconnect Status
- 3) Connection Data
- 4) Configuration Data
- 5) Element Test Results & Configuration
- 6) System T & E Resources

F354 - CONDUCT INTEGRATED SYSTEM TEST & EVALUATION

Description: This function encompasses those activities to verify the overall functional and performance capability of the SDS system. These activities involve maintenance of procedures, performance of functional tests, collection and evaluation of test data, and reporting of test results and status. Evaluation of test results may include special analysis and simulation. Also the preceededs are validated planning factors to be used for operational planning.

| # | Requirement Description |
|--------|---------------------------------------------------------------|
| F354-1 | Procedures & Test Equipment |
| F354-2 | Quality Assurance |
| F354-3 | M/S |
| F354-4 | Acceptance Criteria |
| F354-5 | Trained Personnel (System Level) |
| F354-6 | Element Control Facilities |
| F354-7 | Analytical Tools (System Level) - Modeling - Simulation |

OUTPUT

- 1) Integrated Systemtest Status
- 2) System Test Results & Configuration
- 3) Validated Planning Factors
- 4) I & D Report

INPUT

- 1) PMP TEMP & Changes
- 2) HA Approval & Standards
- 3) OPlans & Procedures
- 4) Records
 - Security Records
 - Training Records
 - HRP Records
- 5) Transition Resources
- 6) System Test Results & Configuration
- 7) Schedules

F36 - TRANSITION TO IOC

Description: This function encompasses those activities to formally transfer operational and support responsibility from the developing agency to the using agency. These activities include validating procedures, review and approval of operation plans, certification of operations and maintenance crew personnel, operational readiness demonstration/inspection, and declaration of operational capability.

Requirement Description

- | | |
|--------|----------------------------------------|
| F36-1 | Management Information System |
| F36-2 | SDS Operations Planning Support System |
| F36-3 | Analytical Tools |
| F36-4 | National Test Bed |
| F36-5 | Trained & Certified Operations Staff |
| F36-6 | Trained Operations Planning Staff |
| F36-7 | Operations Planning Guidance |
| F36-8 | Transition Criteria |
| F36-9 | Quality Assurance Program |
| F36-10 | Exercise Drivers |
| F36-11 | Trained Inspection Team |
| F36-12 | Test Targets & Training Range |

OUTPUT

- 1) Declaration Of Operational Readiness
- 2) System Handover To SDS

INPUT

- 1) OPlans & Procedures
- 2) PMP TEMP & Changes
- 3) HA Approval & Standards
- 4) Schedules
- 5) Update/Approval Resources

F361 - UPDATE/APPROVE OPERATIONS PLANS

Description: This function encompasses those activities to review, update and approve operations and supporting plans. these activities include: review and revision of operations and supporting plans based on revisions in planning factors and system capabilities resulting from the evaluation of integrated system operational test results; coordination of plan charges with the JCS*, and services; and forward approval of the plans by the appropriate authority. The review and approval process may include modeling, simulation, war gaming etc.

| # | Requirement Description |
|--------|-------------------------------------------|
| F361-1 | M/S |
| F361-2 | SDS Operations Planning Support System |
| F361-3 | Analytical Tools (Simulation, War Gaming) |
| F361-4 | MTB |
| F361-5 | Trained Operations Planning Staff |
| F361-6 | Plan Preparation Policy Guidelines |

* Other U&S Commands

OUTPUT

- 1) Approved OPlans

INPUT

- 1) Approved OPlans
- 2) System Test Results & Configuration
- 3) Draft Procedures
- 4) Validation Resources

F362 - VALIDATE OPERATIONAL PROCEDURES

Description: This function involves CINC SDS review and validation of operational procedures (SOPS), task menus, COOPS, etc., developed internally by SDS and SDS components to guide the range of human and automatic procedures and processes to be followed according to prevailing circumstances. the function includes both BMC2 and technical procedures involved in employing sds.

| # | Requirement Description |
|--------|-------------------------|
| F362-1 | Validation Criteria |
| F362-2 | Trained Personnel |
| F362-3 | Quality Assurance |
| F362-4 | National Test Bed |

OUTPUT

- 1) Validated Procedures

INPUT

- 1) Validated Procedures
- 2) Transition/Turnover Plan (T/TP)
- 3) PMP TEMP & Changes
- 4) HA Approval & Standards
- 5) Security Records
- 6) Training Records
- 7) HRP Records
- 8) Personnel & Resources

F363 - CERTIFY SDS PERSONNEL

Description: This function encompasses the formal certification by responsible certification authorities for the qualification of each member of the SDS operational and technical cadre charged with responsibilities critical to the safe and effective maintenance, preparation and operation of the SDS system. The function involves verification of successful completion of formal and out initial training and successful demonstration of in-depth knowledge/understanding of applicable plans, procedures and techniques for employing the SDS in peacetime, crisis and conflict situations.

Requirement Description

- F363-1 Qualification Standards
- F363-2 Certifiable Personnel
- F363-3 Operational Simulators & NTB
- F363-4 Procedures
- F363-5 M/S
- F363-6 Quality Assurance

OUTPUT

- 1) Certification Status
- 2) Certified Personnel

INPUT

- 1) Validated Procedures
- 2) PMP TEMP & Changes
- 3) Transition/Turnover Plan
- 4) Personnel Certification Status
- 5) Certified Personnel
- 6) SDS Ready Assets & Facilities
- 7) Approved OPlans

F364 - PERFORM OPERATIONAL DEMONSTRATION

Description: This function involves a comprehensive demonstration and evaluation of the capability of all organizational, operational and system elements of the SDS to perform the bdm mission. The demonstration, conducted and evaluated by a competent and objective agency external to the SDS mission performance in a simulated conflict environment.

| # | Requirement Description |
|--------|-------------------------------|
| F364-1 | Demonstration Plan |
| F364-2 | Exercise Driver/NTB |
| F364-3 | Trained Inspection Team |
| F364-4 | Test Targets & Training Range |

OUTPUT

- 1) Demonstration Evaluation Results

INPUT

- 1) Approved Operations Plan
- 2) Personnel Certification Status
- 3) Demonstration Evaluation Results
- 4) Certification Resources

F365 - CERTIFY SDS OPERATIONALLY READY

Description: Based on an accepted demonstration and evaluation of SDS mission performance capability, competent authority will certify the SDS operationally ready.

| # | Requirement Description |
|--------|---------------------------------|
| F365-1 | Evaluation Criteria |
| F365-2 | Designated Certifying Authority |

OUTPUT

- 1) Declaration Of Operational Readiness
- 2) System Handover To SDS

STRATEGIC DEFENSE SYSTEM

FUNCTIONAL DESCRIPTIONS
REQUIREMENTS AND INPUT/OUTPUT
(EMPLOYMENT)

INPUT

- 1) Declaration Of Initial Operational Capability (IOC)
- 2) Policy, Missions, And Directions From HA
- 3) External C2, Intelligence, And Friendly Force Reports
- 4) Threat Objects And Events
- 5) Environment
- 6) Deployment Handover Data And Information

F4 - EMPLOY SDS

description: This high level function encompasses all the activities, processes, and means to utilize the deployed SDS to provide defense of the United States and its Allies against strategic ballistic missiles, as well as to provide SDS self defense and to support collateral and external missions, in accordance with national policy, mission requirements, and guidance and direction from Higher Authority (HA). The function involves controlling the SDS, conducting surveillance and discrimination, monitoring and assessing the situation, selecting a defensive response, executing the selected response, and maintaining and supporting the SDS system.

Requirement Description

- F41-1 Command And Control Elements And Resources
- F41-2 Surveillance And Discrimination Elements And Resources
- F41-3 Situation Monitoring And Assessment Resources
- F41-4 Response Selection Resources
- F41-5 Engagement Elements And Resources
- F41-6 System Operations And Maintenance Resources
- F41-7 New And Reconstitution Resources

OUTPUT

- 1) Coordination With And Recommendations To HA
- 2) Warning And Assessment Reports
- 3) Object And Event Data
- 4) Destroyed And Residual Threats
- 5) System Status Data
- 6) Retired Equipment
- 7) Battle Losses And Expenditures

| INPUT | F41 - CONTROL THE SYSTEM | OUTPUT | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------|-------|----------------------------------------------|-------|----------------|-------|------------------------|-------|---------------------------------|-------|------------------------------------------|-------|------------------------------------|-------|--------------------------------------------------------|-------|------------------------------------------------------------|-------|------------------------|--------|-----------------------------------------------------------------------------------|--------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>1) Declaration Of IOC</div> <div>2) Policy, Mission, And Direction From HA</div> <div>3) Situation Data</div> <div>4) Engagement Strategy Nomination</div> <div>5) External C2 Reports And Plans</div> | <div>Description: This High Level Function Encompasses The Processes And Means To Provide High Level Human Control Of The Sds And Its Operations In Accordance With National Policy, Sds Mission Objectives, And Guidance And Direction From Ha. The Function Includes Issuing Command Policy And Guidance, Preparing And Revising Plans And Procedures, Providing Positive Control Of The Sds, And Providing High Level System Management Control.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F41-1</td><td>SDS Commander, Alternates, And Command Staff</td></tr><tr><td>F41-2</td><td>Planning Staff</td></tr><tr><td>F41-3</td><td>Positive Control Teams</td></tr><tr><td>F41-4</td><td>System Management Control Teams</td></tr><tr><td>F41-5</td><td>Primary And Alternate Command Facilities</td></tr><tr><td>F41-6</td><td>Planning And Simulation Facilities</td></tr><tr><td>F41-7</td><td>Primary And Alternate Positive Control Cell Facilities</td></tr><tr><td>F41-8</td><td>Primary And Alternate System Management Control Facilities</td></tr><tr><td>F41-9</td><td>Communications With HA</td></tr><tr><td>F41-10</td><td>Communications And Interfaces With All Other Functions Of The Employ SDS Function</td></tr><tr><td>F41-11</td><td>Means To Receive External C2 Reports And Plans</td></tr></tbody></table> | # | Requirement Description | F41-1 | SDS Commander, Alternates, And Command Staff | F41-2 | Planning Staff | F41-3 | Positive Control Teams | F41-4 | System Management Control Teams | F41-5 | Primary And Alternate Command Facilities | F41-6 | Planning And Simulation Facilities | F41-7 | Primary And Alternate Positive Control Cell Facilities | F41-8 | Primary And Alternate System Management Control Facilities | F41-9 | Communications With HA | F41-10 | Communications And Interfaces With All Other Functions Of The Employ SDS Function | F41-11 | Means To Receive External C2 Reports And Plans | <div>1) Coordination With And Recommendations To HA</div> <div>2) Validate Operational Concepts</div> <div>3) Approved Decision Aids And Validated Procedures</div> <div>4) Current Rules Of Engagement</div> <div>5) Current Defense Preferences</div> <div>6) System Mode Selections</div> <div>7) Engagement Strategy Overrides</div> <div>8) Surveillance And Discrimination Criteria</div> <div>9) System Configuration Criteria</div> <div>10) Recovery And Reconstitution Priorities</div> |
| # | Requirement Description | | | | | | | | | | | | | | | | | | | | | | | | | |
| F41-1 | SDS Commander, Alternates, And Command Staff | | | | | | | | | | | | | | | | | | | | | | | | | |
| F41-2 | Planning Staff | | | | | | | | | | | | | | | | | | | | | | | | | |
| F41-3 | Positive Control Teams | | | | | | | | | | | | | | | | | | | | | | | | | |
| F41-4 | System Management Control Teams | | | | | | | | | | | | | | | | | | | | | | | | | |
| F41-5 | Primary And Alternate Command Facilities | | | | | | | | | | | | | | | | | | | | | | | | | |
| F41-6 | Planning And Simulation Facilities | | | | | | | | | | | | | | | | | | | | | | | | | |
| F41-7 | Primary And Alternate Positive Control Cell Facilities | | | | | | | | | | | | | | | | | | | | | | | | | |
| F41-8 | Primary And Alternate System Management Control Facilities | | | | | | | | | | | | | | | | | | | | | | | | | |
| F41-9 | Communications With HA | | | | | | | | | | | | | | | | | | | | | | | | | |
| F41-10 | Communications And Interfaces With All Other Functions Of The Employ SDS Function | | | | | | | | | | | | | | | | | | | | | | | | | |
| F41-11 | Means To Receive External C2 Reports And Plans | | | | | | | | | | | | | | | | | | | | | | | | | |

INPUT

- 1) Declaration of IOC
- 2) Policy, missions, and direction from HA

F411 - ISSUE COMMAND POLICY AND GUIDANCE

Description: This function encompasses the high level command responsibilities and activities of interpreting and assessing policy and missions for the SDS, establishing command policy and guidance, delegating decision authority to subordinates, and maintaining continuity of command. The function involves coordination with HA, other Unified and Specified (U&S) Commands, and the Component Commands and Services on matters of policy and mission.

Requirement Description

- | | |
|--------|--------------------------------------------------------------------|
| F411-1 | SDS Commander And Alternates |
| F411-2 | Command Staff |
| F411-3 | Primary And Alternate Command Facilities |
| F411-4 | Communications With HA |
| F411-5 | Communications With U&S Commands, Component Commands, And Services |

OUTPUT

- 1) Coordination with HA
- 2) Coordination with U&S Commands, Component Commands, and Services
- 3) Command policy/guidance
- 4) Delegated authority for planning, positive control, and system management control

| <div>INPUT</div> <div><div>1) Declaration Of IOC</div><div>2) Mission, Policy, And Approvals From HA</div><div>3) Inputs From Coordination With U&S Commands, Component Commands, And Services</div></div> | <div>F4111 - INTERPRET/ASSESS POLICY AND MISSIONS</div> <div><div>Description: This command function involves interpretation, assessment, and coordination of existing and proposed policy and SDS missions to update and promulgate the command mission description for the SDS. The function involves assessment of the feasibility and impact of proposed policy and mission changes and includes coordination with HA, other U&S Commands, Component Commands, and Services.</div><div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4111-1</td><td>SDS Commander</td></tr><tr><td>F4111-2</td><td>Command Staff</td></tr><tr><td>F4111-3</td><td>Peacetime Command And Staff Facilities</td></tr><tr><td>F4111-4</td><td>Communications With HA, U&S Commands, Component Commands, And Services</td></tr><tr><td>F4111-5</td><td>Analytical Tools For Feasibility And Impact Assessment</td></tr><tr><td>F4111-6</td><td>Document Production Capabilities</td></tr></table></div></div> | # | Requirement Description | F4111-1 | SDS Commander | F4111-2 | Command Staff | F4111-3 | Peacetime Command And Staff Facilities | F4111-4 | Communications With HA, U&S Commands, Component Commands, And Services | F4111-5 | Analytical Tools For Feasibility And Impact Assessment | F4111-6 | Document Production Capabilities | <div>OUTPUT</div> <div><div>1) Coordination With HA</div><div>2) Outputs Of Coordination With U&S Commands, Component Commands, And Services</div><div>3) Promulgation Of Revised/Updated Command Mission Description</div></div> |
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| # | Requirement Description | | | | | | | | | | | | | | | |
| F4111-1 | SDS Commander | | | | | | | | | | | | | | | |
| F4111-2 | Command Staff | | | | | | | | | | | | | | | |
| F4111-3 | Peacetime Command And Staff Facilities | | | | | | | | | | | | | | | |
| F4111-4 | Communications With HA, U&S Commands, Component Commands, And Services | | | | | | | | | | | | | | | |
| F4111-5 | Analytical Tools For Feasibility And Impact Assessment | | | | | | | | | | | | | | | |
| F4111-6 | Document Production Capabilities | | | | | | | | | | | | | | | |

| | | |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Policy From HA</div><div>2) Command Mission Description</div></div> | <div>F4112 - ESTABLISH COMMAND POLICY/GUIDANCE</div> <div><div>Description: This command function involves developing and providing the command-level policy and guidance for planning, positive control of the SDS, and system management control of subordinate SDS management functions and activities. Inherent in the policy for these is guidance for delegation of authority and for continuity of command.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F4112-1</div><div>SDS Commander</div></div><div><div>F4112-2</div><div>Communications Between Commander And Staff</div></div></div> | <div>OUTPUT</div> <div><div>1) Policy/Guidance For Planning</div><div>2) Policy/Guidance For Positive Control Of SDS</div><div>3) Policy/Guidance For System Management Control</div><div>4) Guidance For Delegation Of Authority</div><div>5) Guidance For Continuity Of Command</div></div> |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <div>INPUT</div> <div>1) Command Policy And Guidance For Delegation Of Authority</div> | <div>F4113 - DELEGATE DECISION AUTHORITY</div> <div>Description: This command function involves the formalized delegation of decision authority to subordinates in accordance with command policy and guidance. The function provides for delegation of decision authority for planning, positive control, and system management control. It also provides authority for acting commanders and successors to the SDS Commander.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4113-1</td><td>SDS Commander</td></tr><tr><td>F4113-2</td><td>Communications Between Commander And Subordinates</td></tr></tbody></table> | # | Requirement Description | F4113-1 | SDS Commander | F4113-2 | Communications Between Commander And Subordinates | <div>OUTPUT</div> <div>1) Authority For Planning 2) Authority For Positive Control 3) Authority For System Management Control 4) Authority For Acting Commanders And Successors To The SDS Commander</div> |
|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|---------------|---------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4113-1 | SDS Commander | | | | | | | |
| F4113-2 | Communications Between Commander And Subordinates | | | | | | | |

INPUT

- 1) Command Mission Description
- 2) Guidance For Continuity Of Command
- 3) Authority For Acting Commander And Successors To Commander
- 4) Evaluation Of Threat

F4114 - MAINTAIN CONTINUITY OF COMMAND

Description: This function encompasses all provisions and activities to ensure there is at all times one valid SDS Commander and that he is recognized as such by the structure, including HA, other U&S Commands, and subordinate personnel within the SDS. It includes establishment of a continuity of command plan and implementation of day-to-day continuity of command, change of location of command, and devolution of command.

Requirement Description

- | | |
|---------|-------------------------------------------------------------------------------|
| F4114-1 | SDS Commander And Alternates |
| F4114-2 | Continuity Of Command Planning Staff |
| F4114-3 | Primary And Alternate Command Facilities (Including Personnel Transportation) |
| F4114-4 | Communications Between Commander And Staff |
| F4114-5 | Communications Among Primary And Alternate Facilities |
| F4114-6 | Communications With HA, U&S Commands, And Subordinate Commands |

OUTPUT

- 1) One Valid And Recognized SDS Commander At All Times

| | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Approvals From HA</div><div>2) Command Policy/Guidance For Planning</div><div>3) Authority For Planning</div><div>4) Threat Evaluation</div><div>5) External C2 Plans</div></div> | <div>F412 - PREPARE/REVISE PLANS AND PROCEDURES</div> <div><div>Description: This function encompasses deliberate planning and associated activities to define system and force requirements, formulate operational concepts and plans, develop baseline rules of engagement, refine decision aids and procedures, and conduct operational exercises. The function involves coordination with HA, other U&S Commands, Component Commands, and Services.</div><div><div>#</div><div>Requirement Description</div><div>F412-1Planning Staff</div><div>F412-2Planning Facilities</div><div>F412-3Simulation Capabilities</div><div>F412-4Facilities For Operational Exercises And Data Collection</div><div>F412-5Data Analysis Tools</div></div></div> | <div>OUTPUT</div> <div><div>1) Coordination With And Recommendations To Ha</div><div>2) Exercise Plans And Results</div><div>3) Validated System/Force Requirements</div><div>4) Validated Operational Concepts</div><div>5) Baseline Rules Of Engagement</div><div>6) Approved Decision Aids And Procedures</div></div> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

INPUT

- 1) Command Policy/Guidance For Requirements Planning
- 2) Authority For Requirements Planning
- 3) Approval Of Recommendations By HA
- 4) Threat Evaluation

F4121 - CONDUCT REQUIREMENTS PLANNING

Description: This staff function involves analysis of system and force requirements and potential solutions leading to definition and validation of statements of required operational capabilities for the strategic ballistic missile defense mission area. The function is conducted in accordance with command policy/guidance and delegated authorities for system and force planning.

| # | Requirement Description |
|---|-------------------------|
|---|-------------------------|

| | |
|---------|----------------|
| F4121-1 | Planning Staff |
|---------|----------------|

| | |
|---------|---------------------|
| F4121-2 | Planning Facilities |
|---------|---------------------|

| | |
|---------|---------------------------------------|
| F4121-3 | Channels To Obtain Validation From HA |
|---------|---------------------------------------|

OUTPUT

- 1) Statements Of Required Operational Capabilities

| | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Command Policy/Guidance For Operational Planning</div><div>2) Authority To Conduct Operational Planning</div><div>3) Approvals From HA</div><div>4) Threat Evaluation</div><div>5) External Command And Control Reports And Plans</div><div>6) Operational Exercise Results</div></div> | <div>F4122 - CONDUCT OPERATIONAL PLANNING</div> <div><div>Description: This staff function involves the formulation, evaluation, and coordination of concepts of operation, and the development and promulgation of formal operational plans for validated concepts of operation. The function encompasses concepts and plans for peacetime operations, crisis/alert operations, engagement operations, continuity of operations, and recovery and reconstitution.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F4122-1</div><div>Planning Staff</div></div><div><div>F4122-2</div><div>Planning Facilities</div></div><div><div>F4122-3</div><div>Simulation Facilities</div></div><div><div>F4122-4</div><div>Means To Obtain Validation Of Concepts Of Operation</div></div></div> | <div>OUTPUT</div> <div><div>1) Validated Concepts Of Operation</div><div>2) Peacetime Operational Plans</div><div>3) Crisis/Alert Operational Plans</div><div>4) Engagement Operational Concepts And Plans</div><div>5) Continuity Of Operational Plans</div><div>6) Recovery/Reconstitution Concept And Plans</div></div> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

INPUT

- 1) Command Policy/Guidance For ROE Planning
- 2) Authority For ROE Planning
- 3) Approvals From HA
- 4) Validated Operational Concepts
- 5) Threat Evaluation
- 6) Operational Exercise Results

F4123 - DEVELOP BASELINE ROES

Description: This function encompasses deliberate activities and processes leading to the dissemination of formal baseline rules of engagement (ROEs) in the format in which they will be used by personnel and/or machines of the SDS. ROEs set forth the conditions under which engagements can be initiated and continued. The function involves identification for new or revised ROEs, formulation and evaluation of ROE constructs, coordination to obtain validation from HA, and input and dissemination of validated ROEs to positive control and battle management functions.

Requirement Description

- | | |
|---------|----------------------------------------------------------------------------------------------------|
| F4123-1 | Planning Staff |
| F4123-2 | Planning Facilities |
| F4123-3 | Simulation Facilities |
| F4123-4 | Process To Obtain Validation Of ROEs From HA |
| F4123-5 | Interface And High Assurance Communications For Dissemination Of Roe Constructs To Battle Managers |

OUTPUT

- 1) Baseline ROE Recommendations
- 2) Validated Baseline ROEs

INPUT

- 1) Validated Operational Concepts
- 2) Validated Baseline ROEs
- 3) Approvals From HA
- 4) Threat Evaluation
- 5) Operational Exercise Results

F4124 - DEVELOP/REFINE DECISION AIDS AND PROCEDURES

Description: This function encompasses activities and processes to develop and refine decision aids and procedures for conduct of exercises, positive control, system management control, and situation monitoring and assessment. It involves identification of needs and opportunities for enhancements, formulation and evaluation of new and revised decision aids and procedures, coordination to obtain approval or validation, and installation of decision aids and promulgation of procedures.

| # | <u>Requirement Description</u> |
|---------|----------------------------------------------------------|
| F4124-1 | Planning Staff |
| F4124-2 | Planning Facilities |
| F4124-3 | Simulation Facilities |
| F4124-4 | Process To Obtain Approval Or Validation |
| F4124-5 | Hardware And Interface To Install Approved Decision Aids |
| F4124-6 | Format And Means To Promulgate Validated Procedures |

OUTPUT

- 1) Recommended Procedures
- 2) Approved Decision Aids
- 3) Validated Procedures

INPUT

- 1) Validated Operational Concepts
- 2) Validated Baseline ROEs
- 3) Approved Decision Aids
- 4) Validated Procedures
- 5) HA Approval Of Exercise Plans
- 6) Threat Evaluation

F4125 - CONDUCT OPERATIONAL EXERCISES

Description: This function encompasses activities associated with preparing for, conducting, and developing findings from operational exercises of personnel, plans, procedures, software, and/or equipment of the SDS. The function involves formulation of exercise objectives, development and coordination of exercise plans, as-needed configuration of systems and facilities to support exercises, exercise conduct and data collection, and analysis and reporting of findings.

Requirement Description

| | |
|---------|-----------------------------------------------------------------------------|
| F4125-1 | Planning Staff |
| F4125-2 | Planning Facilities |
| F4125-3 | Process And Means For Coordination Of Exercise Plans |
| F4125-4 | Simulation Facilities For Exercise Support |
| F4125-5 | Capability To Configure SDS Systems And Facilities For Support Of Exercises |
| F4125-6 | Operational Personnel To Participate In Exercises |
| F4125-7 | Capability To Collect And Reduce Exercise Data |
| F4125-8 | Tools For Analysis Of Exercise Data |
| F4125-9 | Means To Report Exercise Results |

OUTPUT

- 1) Coordination Of Exercise Plans
- 2) Final Approved Exercise Plans
- 3) Reports Of Exercise Results

| INPUT | F413 - PROVIDE POSITIVE CONTROL | OUTPUT |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>1) National Policy</div> <div>2) SDS Mission</div> <div>3) Baseline Defense Preferences</div> <div>4) Command Policy/Guidance For Positive Control</div> <div>5) Delegated Decision Authority</div> <div>6) Validated Operational Concepts</div> <div>7) Baseline ROEs</div> <div>8) Approved Decision Aids</div> <div>9) Validated Procedures</div> <div>10) Approval/Direction From HA</div> <div>11) Situation Data</div> <div>12) Attack Warning And Assessment</div> <div>13) External C2 Reports And Plans</div> <div>14) Engagement Strategy Nomination</div> | <div>Description: This function encompasses the processes and means to maintain continuous human positive control of the SDS and its operation in accordance with national policy, baseline defense preferences, applicable command policy/guidance, delegated decision authority, validated operational concepts, ROEs, validated procedures, and approvals and direction from HA. The function includes revision of baseline ROEs, adjustment of baseline defense preferences, adjustment of system mode, approval or override of engagement strategy nominations, and continuity of positive control.</div> <div><div>#</div><div>Requirement Description</div><div>F413-1</div><div>Qualified Positive Control Teams</div><div>F413-2</div><div>Primary And Alternate Positive Control Cells</div><div>F413-3</div><div>Man-machine Interfaces To SDS Battle Management</div><div>F413-4</div><div>Communications With HA</div><div>F413-5</div><div>Communications With Other U&S Commands</div><div>F413-6</div><div>Communications Among Positive Control Cells</div><div>F413-7</div><div>Interface With Situation Monitoring And Assessment</div></div> | <div>1) Real-time ROE Recommendations To HA</div> <div>2) ROE Revisions</div> <div>3) Adjustments To Defense Preferences</div> <div>4) System Mode Selections</div> <div>5) Engagement Strategy Overrides</div> |

INPUT

- 1) Command Policy/Guidance For Positive Control
- 2) Delegated Authority For Positive Control
- 3) Validated Procedures For Positive Control
- 4) Baseline ROEs
- 5) Approvals And Direction From HA
- 6) Situation Assessment
- 7) External C2 Reports, Requests, And Plans

F4131 - REVISE RULES OF ENGAGEMENT (ROEs)

Description: This positive control function encompasses processes and means to recommend expeditious changes in baseline ROEs and to implement changes as directed by HA. It involves monitoring the situation, including reports and requests from other U&S Commanders, identifying potential problems with baseline ROEs, and recommending expeditious changes for HA consideration. It also involves implementation of expeditious ROE changes as approved or otherwise directed by HA, including revision of parameters in ROE constructs, masking or unmasking of ROE constructs, dissemination of changes to alternate positive control cells and automated battle managers, and reporting completion of ROE change implementations.

Requirement Description

- F4131-1 Qualified Positive Control Teams
- F4131-2 Positive Control Cell Facilities
- F4131-3 Communications With HA
- F4131-4 Means To Obtain Situation Assessment
- F4131-5 Means To Receive Reports And Requests From Other U&S Commands
- F4131-6 Quick-look ROE Assessment Capabilities
- F4131-7 Communications With Alternate Positive Control Cells
- F4131-8 Man-machine Interface To SDS Battle Management
- F4131-9 High Assurance Communications For ROE Change Dissemination

OUTPUT

- 1) ROE Change Recommendations To HA
- 2) Approved Or Directed ROE Construct Changes To Alternate Positive Control Cells And To SDS Battle Managers
- 3) ROE Change Implementation Completion Reports

| INPUT | F4132 - ADJUST DEFENSE PREFERENCES | OUTPUT | | | | | | | | | | | | | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------|---------|----------------------------------|---------|----------------------------------|---------|------------------------|---------|---------------------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------|---------|------------------------------------------------------|---------|------------------------------------------------------|---------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>1) Command Policy/Guidance For Positive Control</div> <div>2) Delegated Authority For Positive Control</div> <div>3) Validated Procedures For Positive Control</div> <div>4) Baseline Defense Preferences</div> <div>5) Guidance/Direction From HA</div> <div>6) Situation Assessment</div> <div>7) External Reports And Plans For Defended Assets</div> | <div>Description: This positive control function encompasses processes and means for implementation and dissemination of defense preference weight changes as directed by HA and, to the extent allowed, in response to situation dynamics. It involves receipt of defense preference guidance from HA, establishing/entering baseline land area and asset category preferences, adjusting preference weights in response to situation dynamics (e.g., force generation activities, missile launches, asset destruction), dissemination of preference weight changes to alternate positive control cells and to SDS battle managers, and reporting of defense preference change implementations.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4132-1</td><td>Qualified Positive Control Teams</td></tr><tr><td>F4132-2</td><td>Positive Control Cell Facilities</td></tr><tr><td>F4132-3</td><td>Communications With HA</td></tr><tr><td>F4132-4</td><td>Means To Flowdown Higher Level Defense Preference Guidance To Specific Land Area And Asset Preference Weights</td></tr><tr><td>F4132-5</td><td>Means To Obtain Real-time Defended Asset Situation/Status Data And To Adjust Preference Weights Accordingly</td></tr><tr><td>F4132-6</td><td>Communications With Alternate Positive Control Cells</td></tr><tr><td>F4132-7</td><td>Man-machine Interface To Automated Battle Management</td></tr><tr><td>F4132-8</td><td>High Assurance Communications For Dissemination Of Defense Preference Weight Changes To Battle Managers</td></tr></tbody></table> | # | Requirement Description | F4132-1 | Qualified Positive Control Teams | F4132-2 | Positive Control Cell Facilities | F4132-3 | Communications With HA | F4132-4 | Means To Flowdown Higher Level Defense Preference Guidance To Specific Land Area And Asset Preference Weights | F4132-5 | Means To Obtain Real-time Defended Asset Situation/Status Data And To Adjust Preference Weights Accordingly | F4132-6 | Communications With Alternate Positive Control Cells | F4132-7 | Man-machine Interface To Automated Battle Management | F4132-8 | High Assurance Communications For Dissemination Of Defense Preference Weight Changes To Battle Managers | <div>1) Defense Preference Weight Changes To Alternate Positive Control Cells And SDS Battle Managers</div> <div>2) Defense Preference Change Implementation Completion Reports</div> |
| # | Requirement Description | | | | | | | | | | | | | | | | | | | |
| F4132-1 | Qualified Positive Control Teams | | | | | | | | | | | | | | | | | | | |
| F4132-2 | Positive Control Cell Facilities | | | | | | | | | | | | | | | | | | | |
| F4132-3 | Communications With HA | | | | | | | | | | | | | | | | | | | |
| F4132-4 | Means To Flowdown Higher Level Defense Preference Guidance To Specific Land Area And Asset Preference Weights | | | | | | | | | | | | | | | | | | | |
| F4132-5 | Means To Obtain Real-time Defended Asset Situation/Status Data And To Adjust Preference Weights Accordingly | | | | | | | | | | | | | | | | | | | |
| F4132-6 | Communications With Alternate Positive Control Cells | | | | | | | | | | | | | | | | | | | |
| F4132-7 | Man-machine Interface To Automated Battle Management | | | | | | | | | | | | | | | | | | | |
| F4132-8 | High Assurance Communications For Dissemination Of Defense Preference Weight Changes To Battle Managers | | | | | | | | | | | | | | | | | | | |

INPUT

- 1) Command Policy/Guidance For Positive Control
- 2) Delegated Authority For Positive Control
- 3) Validated Procedures For Positive Control
- 4) Baseline And Revised ROEs
- 5) Baseline And Revised Defense Preferences
- 6) Approval/Direction From HA
- 7) Situation Summaries
- 8) Warning And Assessment Of Attack

F4133 - ADJUST SYSTEM MODE

Description: This positive control function encompasses processes and means to select and change the SDS mode, including changes in system alert levels and enablement/termination of countermeasure and engagement actions. The function involves monitoring of the situation with respect to system mode selection criteria, recommending mode changes to HA as time allows, verifying conditional authority to change system mode in emergency conditions, adjusting the mode in accordance with criteria or as directed by HA, entering and disseminating mode selection changes to alternate positive control cells and SDS battle managers, and reporting implementation of system mode changes.

Requirement Description

- | | |
|---------|------------------------------------------------------------------------------------|
| F4133-1 | Qualified Positive Control Teams |
| F4133-2 | Positive Control Cell Facilities |
| F4133-3 | Communications With HA |
| F4133-4 | Means To Obtain Situation Summaries And Warning And Assessment Of Attack |
| F4133-5 | Communication With Alternate Positive Control Cells |
| F4133-6 | Man-machine Interface To Automated Battle Management |
| F4133-7 | High Assurance Communication To Disseminate System Mode Changes To Battle Managers |

OUTPUT

- 1) System Mode Change Recommendations To HA
- 2) Mode Changes To Alternate Positive Control Cells And SDS Battle Managers
- 3) Mode Change Implementation Completion Reports

| INPUT | F4134 - APPROVE/OVERRIDE ENGAGEMENT STRATEGY SELECTION | OUTPUT | | | | | | | | | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------|---------|----------------------------------|---------|----------------------------------|---------|----------------------------------------|---------|---------------------------------------------------------------------------------------------------------|---------|------------------------------------------------------|---------|------------------------------------------------------|---------|--------------------------------------------------------|---------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <div>1) Command Policy/Guidance For Positive Control</div> <div>2) Delegated Authority For Positive Control</div> <div>3) Validated Procedures For Positive Control</div> <div>4) Baseline And Revised ROEs</div> <div>5) Baseline And Revised Defense Preferences</div> <div>6) System Mode Selection</div> <div>7) Situation Assessment</div> <div>8) Engagement Strategy Nomination</div> | <div>Description: This positive control function encompasses processes and means to ensure engagement strategy selections by SDS battle management are valid and, if not, to override such selections with alternate strategy selections. The function is triggered by receipt of an engagement strategy nomination from SDS battle management and includes quick-look assessment of the validity and optimality of that selection, implicit approval if the nominated selection is satisfactory or override if not, and reporting of the current engagement strategy selection. In the case where an override is warranted, the function also involves quick-look review of alternate strategy options for validity and optimality, selection and entry of an alternate strategy selection, and dissemination of the override strategy to SDS battle managers.</div> <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4134-1</td><td>Qualified Positive Control Teams</td></tr><tr><td>F4134-2</td><td>Positive Control Cell Facilities</td></tr><tr><td>F4134-3</td><td>Means To Receive Situation Assessments</td></tr><tr><td>F4134-4</td><td>Decision Aids And/Or Procedures For Quick-look Evaluation Of Engagement Strategy Selections And Options</td></tr><tr><td>F4134-5</td><td>Communications With Alternate Positive Control Cells</td></tr><tr><td>F4134-6</td><td>Man-machine Interface To Automated Battle Management</td></tr><tr><td>F4134-7</td><td>High Assurance Communications With SDS Battle Managers</td></tr><tr><td>F4134-8</td><td>Communications With HA (And Possibly U&S Commands)</td></tr></table> | # | Requirement Description | F4134-1 | Qualified Positive Control Teams | F4134-2 | Positive Control Cell Facilities | F4134-3 | Means To Receive Situation Assessments | F4134-4 | Decision Aids And/Or Procedures For Quick-look Evaluation Of Engagement Strategy Selections And Options | F4134-5 | Communications With Alternate Positive Control Cells | F4134-6 | Man-machine Interface To Automated Battle Management | F4134-7 | High Assurance Communications With SDS Battle Managers | F4134-8 | Communications With HA (And Possibly U&S Commands) | <div>1) Strategy Selection Override And Alternate Selection</div> <div>2) Report Of Current Engagement Strategy Selection</div> |
| # | Requirement Description | | | | | | | | | | | | | | | | | | | |
| F4134-1 | Qualified Positive Control Teams | | | | | | | | | | | | | | | | | | | |
| F4134-2 | Positive Control Cell Facilities | | | | | | | | | | | | | | | | | | | |
| F4134-3 | Means To Receive Situation Assessments | | | | | | | | | | | | | | | | | | | |
| F4134-4 | Decision Aids And/Or Procedures For Quick-look Evaluation Of Engagement Strategy Selections And Options | | | | | | | | | | | | | | | | | | | |
| F4134-5 | Communications With Alternate Positive Control Cells | | | | | | | | | | | | | | | | | | | |
| F4134-6 | Man-machine Interface To Automated Battle Management | | | | | | | | | | | | | | | | | | | |
| F4134-7 | High Assurance Communications With SDS Battle Managers | | | | | | | | | | | | | | | | | | | |
| F4134-8 | Communications With HA (And Possibly U&S Commands) | | | | | | | | | | | | | | | | | | | |

INPUT

- 1) Command Policy/Guidance For Positive Control
- 2) Delegated Authority For Positive Control
- 3) Validated Procedures For Positive Control
- 4) Continuity Of Operations Plan
- 5) Baseline And Revised ROEs
- 6) Baseline And Revised Defense Preferences
- 7) Current System Mode Selection
- 8) Current Engagement Strategy Selection
- 9) Situation Assessments Relevant To Relocation And Devolution Of Positive Control

F4135 - MAINTAIN CONTINUITY OF POSITIVE CONTROL

Description: This function encompasses the processes and means to ensure that there is at all times one valid team and cell exercising positive control over the SDS, and that the acting cell is recognized as such by the system and external interfaces. The function includes implementation of day-to-day continuity of positive control, relocation of positive control, and devolution of positive control in accordance with continuity of operations plans and validated procedures.

Requirement Description

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|---------|---------------------------------------------------------------------------------------------|
| F4135-1 | Primary And Alternate Positive Control Teams |
| F4135-2 | Primary And Alternate Positive Control Cell Facilities (Including Personnel Transportation) |
| F4135-3 | Communications With SDS Commander |
| F4135-4 | Communications Among Primary And Alternate Positive Control Cells |
| F4135-5 | Communications With HA, U&S Commands, And Subordinate Commands |
| F4135-6 | Interfaces To Situation Assessment And Battle Management Functions Of The SDS |

OUTPUT

- 1) One Valid And Recognized Team And Cell Exercising Positive Control Over The Sds

| INPUT | F414 - PROVIDE SYSTEM MANAGEMENT CONTROL | OUTPUT | | | | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------|--------|---------------------------------|--------|------------------------------------------------------------|--------|-----------------------------------------------------------------------------------|--------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <div>1) Command Policy/Guidance For System Management Control</div> <div>2) Delegated Authority For System Management Control</div> <div>3) Validated Procedures For System Management Control</div> <div>4) System Mode Selection</div> <div>5) Situation Data</div> <div>6) External C2 Reports And Plans</div> | <div>Description: This command and control function encompasses the processes and means for high level human control of the subordinate SDS system management activities, both the fully automated management activities and those involving humans. The functions includes establishment of surveillance and discrimination (S&D) criteria, establishment of system configuration criteria, definition of recovery and reconstitution priorities, and continuity of system management control.</div> <div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F414-1</td><td>System Management Control Teams</td></tr><tr><td>F414-2</td><td>Primary And Alternate System Management Control Facilities</td></tr><tr><td>F414-3</td><td>Interfaces To System Mode Selection And Situation Assessment Functions Of The SDS</td></tr><tr><td>F414-4</td><td>Means To Receive External C2 Reports And Plans</td></tr></table></div> | # | Requirement Description | F414-1 | System Management Control Teams | F414-2 | Primary And Alternate System Management Control Facilities | F414-3 | Interfaces To System Mode Selection And Situation Assessment Functions Of The SDS | F414-4 | Means To Receive External C2 Reports And Plans | <div>1) S&D Criteria</div> <div>2) System Configuration Criteria</div> <div>3) Recovery And Reconstitution Priorities</div> |
| # | Requirement Description | | | | | | | | | | | |
| F414-1 | System Management Control Teams | | | | | | | | | | | |
| F414-2 | Primary And Alternate System Management Control Facilities | | | | | | | | | | | |
| F414-3 | Interfaces To System Mode Selection And Situation Assessment Functions Of The SDS | | | | | | | | | | | |
| F414-4 | Means To Receive External C2 Reports And Plans | | | | | | | | | | | |

INPUT

- 1) Command Policy/Guidance For System Management Control
- 2) Delegated Authority For System Management Control
- 3) Validated Procedures For System Management Control
- 4) System Mode Selection
- 5) Situation Data

F4141 - ESTABLISH SURVEILLANCE AND DISCRIMINATION CRITERIA

Description: This command and control function encompasses the processes and means to establish and disseminate high level criteria to be followed by surveillance and discrimination human and automated managers. S&D criteria to be established include but are not limited to S&D management reporting requirements, S&D resource allocation criteria, sensor detection and false alarm rate objectives, and criteria for use of expendable S&D assets. The function involves assessment of the need for revised S&D criteria, establishing/setting the new criteria, and disseminating the criteria changes to system management nodes.

Requirement Description

F4141-1 System Management Control Teams

F4141-2 System Management Control Facilities

F4141-3 Interfaces To System Mode Selection And Situation Assessment Functions Of The SDS

F4141-4 Decision Aids And Analytical Tools For Assessing Alternative S&D Criteria

OUTPUT

- 1) S&D Management Reporting Requirements
- 2) S&D Resource Allocation Criteria
- 3) Detection And False Alarm Rate Objectives
- 4) Criteria For Use Of Expendable S&D Assets
- 5) Other S&D Management Criteria As Needed

| INPUT | F4142 - ESTABLISH SYSTEM CONFIGURATION CRITERIA | OUTPUT | | | | | | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------|---------|---------------------------------|---------|------------------------------------------------------------|---------|-------------------------------------------------------------------------------------|---------|------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>1) Command Policy/Guidance For System Management Control</div> <div>2) Delegated Authority For System Management Control</div> <div>3) Validated Procedures For System Management Control</div> <div>4) Situation Data</div> <div>5) System Mode Selection</div> | <div>Description: This command and control function encompasses the processes and means to establish and disseminate criteria to be followed in the management of the operational and support configuration of the SDS. System configuration criteria include but are not limited to space/time coverage criteria, communications management criteria, criteria for use of reserve and spare assets, and system status reporting requirements. The function involves assessment of the need for revised system configuration criteria, establishment of the new criteria, and dissemination of the criteria changes to operational configuration management and system support functions of the SDS.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4142-1</td><td>System Management Control Teams</td></tr><tr><td>F4142-2</td><td>Primary And Alternate System Management Control Facilities</td></tr><tr><td>F4142-3</td><td>Interfaces With System Mode Selection And Situation Assessment Functions Of The SDS</td></tr><tr><td>F4142-4</td><td>Decision Aids And Analytical Tools For Assessment Of Alternative System Configuration Criteria</td></tr><tr><td>F4142-5</td><td>Communications And Interfaces For Dissemination Of Criteria Changes To Operational Configuration Management And System Support Nodes Of The SDS</td></tr></tbody></table> | # | Requirement Description | F4142-1 | System Management Control Teams | F4142-2 | Primary And Alternate System Management Control Facilities | F4142-3 | Interfaces With System Mode Selection And Situation Assessment Functions Of The SDS | F4142-4 | Decision Aids And Analytical Tools For Assessment Of Alternative System Configuration Criteria | F4142-5 | Communications And Interfaces For Dissemination Of Criteria Changes To Operational Configuration Management And System Support Nodes Of The SDS | <div>1) Space/Time Coverage Criteria</div> <div>2) Communications Management Criteria</div> <div>3) Criteria For Use Of Reserve And Spare Assets</div> <div>4) System Status Reporting Requirements</div> <div>5) Other System Configuration Criteria As Applicable</div> |
| # | Requirement Description | | | | | | | | | | | | | |
| F4142-1 | System Management Control Teams | | | | | | | | | | | | | |
| F4142-2 | Primary And Alternate System Management Control Facilities | | | | | | | | | | | | | |
| F4142-3 | Interfaces With System Mode Selection And Situation Assessment Functions Of The SDS | | | | | | | | | | | | | |
| F4142-4 | Decision Aids And Analytical Tools For Assessment Of Alternative System Configuration Criteria | | | | | | | | | | | | | |
| F4142-5 | Communications And Interfaces For Dissemination Of Criteria Changes To Operational Configuration Management And System Support Nodes Of The SDS | | | | | | | | | | | | | |

INPUT

- 1) Command Policy/Guidance For System Management Control
- 2) Delegated Authority For System Management Control
- 3) Validated Procedures For System Management Control
- 4) Situation Data
- 5) External C2 Reports And Plans

F4143 - DEFINE SYSTEM RECOVERY AND RECONSTITUTION PRIORITIES

Description: This command and control function encompasses processes and means to set recovery and reconstitution priorities to be followed, respectively, by the operational configuration management and reconstitution functions of the SDS. The function involves monitoring the situation with respect to recovery and reconstitution, establishing priorities, and disseminating the priorities to operational configuration management and reconstitution nodes of the SDS.

Requirement Description

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|---------|-------------------------------------------------------------------------------------------------------------|
| F4143-1 | System Management Control Teams |
| F4143-2 | Primary And Alternate System Management Control Facilities |
| F4143-3 | Interfaces With The System Mode Selection And Situation Assessment Functions Of The SDS |
| F4143-4 | Means To Receive External C2 Reports And Plans |
| F4143-5 | Decision Aids And Analytical Tools For Assessment Of Alternative Recovery And Reconstitution Priorities |
| F4143-6 | Communications And Interfaces With Operational Configuration Management And Reconstitution Nodes Of The SDS |

OUTPUT

- 1) System Recovery Priorities
- 2) System Reconstitution Priorities

| INPUT | F4144 - MAINTAIN CONTINUITY OF SYSTEM MANAGEMENT CONTROL | OUTPUT | | | | | | | | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------|---------|-------------------------------------------------------|---------|-------------------------------------------------------------------------------------------------|---------|-------------------------------------------------------------------|---------|--------------------------------------------------------|---------|--------------------------------------------------------|---------|------------------------------------------------|----------------------------------------------------------------------------|
| <div>1) Command Policy/Guidance For System Management Control</div> <div>2) Delegated Authority For System Management Control</div> <div>3) Validated Procedures For System Management Control</div> <div>4) Continuity Of Operations Plan</div> <div>5) Baseline And Revised S&D Criteria</div> <div>6) Baseline And Revised System Configuration Criteria</div> <div>7) Current Recovery And Reconstitution Priorities</div> <div>8) Situation Data</div> | <div>Description: The function encompasses the processes and means to ensure there exists a valid and recognized set of nodes executing system management control of the SDS. The function includes implementation of day-to-day continuity of system management control, relocation of system management control, and devolution of system management control.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4144-1</td><td>Primary And Alternate System Management Control Teams</td></tr><tr><td>F4144-2</td><td>Primary And Alternate System Management Control Facilities (Including Personnel Transportation)</td></tr><tr><td>F4144-3</td><td>Procedures For Day-to-day Continuity Of System Management Control</td></tr><tr><td>F4144-4</td><td>Procedures For Relocation Of System Management Control</td></tr><tr><td>F4144-5</td><td>Procedures For Devolution Of System Management Control</td></tr><tr><td>F4144-6</td><td>Interface To The Situation Assessment Function</td></tr></tbody></table> | # | Requirement Description | F4144-1 | Primary And Alternate System Management Control Teams | F4144-2 | Primary And Alternate System Management Control Facilities (Including Personnel Transportation) | F4144-3 | Procedures For Day-to-day Continuity Of System Management Control | F4144-4 | Procedures For Relocation Of System Management Control | F4144-5 | Procedures For Devolution Of System Management Control | F4144-6 | Interface To The Situation Assessment Function | <div>1) One Valid, Recognized Set Of System Management Control Nodes</div> |
| # | Requirement Description | | | | | | | | | | | | | | | |
| F4144-1 | Primary And Alternate System Management Control Teams | | | | | | | | | | | | | | | |
| F4144-2 | Primary And Alternate System Management Control Facilities (Including Personnel Transportation) | | | | | | | | | | | | | | | |
| F4144-3 | Procedures For Day-to-day Continuity Of System Management Control | | | | | | | | | | | | | | | |
| F4144-4 | Procedures For Relocation Of System Management Control | | | | | | | | | | | | | | | |
| F4144-5 | Procedures For Devolution Of System Management Control | | | | | | | | | | | | | | | |
| F4144-6 | Interface To The Situation Assessment Function | | | | | | | | | | | | | | | |

INPUT

- 1) System Mode Selection
- 2) S&D Criteria
- 3) Situation Data
- 4) System Status Data
- 5) Kill Assessment Observables
Collection Requests
- 6) Object And Event Observables
- 7) Background Environment

F42 - CONDUCT SURVEILLANCE AND DISCRIMINATION

Description: This high level function encompasses processes and organic means to obtain, and process into useful form, real time data on objects and events relevant to the SDS mission in accordance with the selected system mode and the surveillance and discrimination (S&D) criteria from the system management control function. The function includes managing S&D, obtaining and bulk processing observables, initiating and maintaining track files, classifying and identifying objects and events, and employing expendable S&D assets. Requirement Description

Requirement Description

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|-------|--------------------------------------------------------------------------------------|
| F42-1 | S&D Management Capabilities And Resources |
| F42-2 | S&D Observables Collection Elements And Resources |
| F42-3 | Computational Resources |
| F42-4 | Communications And Interfaces With All Other Functions Of The Employ SDS Function |

OUTPUT

- 1) S&D Activity Reports
- 2) Object/Event Data
- 3) S&D Expenditures

| <div>INPUT</div> <div><div>1) System Mode Selection</div><div>2) S&D Criteria</div><div>3) Situation Data</div><div>4) S&D Expenditure Reports</div><div>5) Track File</div><div>6) System Status Data</div><div>7) Kill Assessment Observables</div><div>Collection Requests</div></div> | <div>F421 - MANAGE SURVEILLANCE AND DISCRIMINATION</div> <div>Description: This function encompasses the processes and means to to manage surveillance and discrimination to meet SDS requirements in accordance with the system mode selection, S&D criteria, kill assessment observables collection requests, and situation and other data. The function includes determining S&D requirements, assigning and tasking S&D resources, assigning and tasking object/event data reporting, authorizing use of expendable S&D assets, and maintaining continuity of S&D management.</div> <div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F421-1</td><td>S&D Management Resources (Personnel And Computational Resources)</td></tr><tr><td>F421-2</td><td>Host Facilities And/Or Platforms</td></tr></table></div> | # | Requirement Description | F421-1 | S&D Management Resources (Personnel And Computational Resources) | F421-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div><div>1) S&D Activity Reports</div><div>2) S&D Control And Tasking</div></div> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|--------|------------------------------------------------------------------|--------|----------------------------------|--------------------------------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F421-1 | S&D Management Resources (Personnel And Computational Resources) | | | | | | | |
| F421-2 | Host Facilities And/Or Platforms | | | | | | | |

| <p>INPUT</p> <p>1) S&D Management Reporting Requirements</p> <p>2) System Mode Selection</p> <p>3) Track File</p> <p>4) Situation Data</p> <p>5) S&D Expenditure Reports</p> <p>6) S&D Activity Reports</p> | <p>F4211 - DETERMINE SURVEILLANCE AND DISCRIMINATION REQUIREMENTS</p> <p>Description: This function encompasses the processes and means to determine the S&D operational requirements so that S&D resources can be efficiently assigned and tasked. The function involves determining search volume coverage requirements, observables collection and processing requirements, and object/event data distribution requirements. The requirements are established at a system level and provide the guidelines for the subsequent assignment and tasking of S&D resources.</p> <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F4211-1</td><td>S&D Management Resources</td></tr><tr><td>F4211-2</td><td>Host Facilities And/Or Platforms</td></tr></table> | # | <u>Requirement Description</u> | F4211-1 | S&D Management Resources | F4211-2 | Host Facilities And/Or Platforms | <p>OUTPUT</p> <p>1) S&D Requirements</p> <p>2) S&D Reporting Requirements</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|---------|--------------------------|---------|----------------------------------|---------------------------------------------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | | | |
| F4211-1 | S&D Management Resources | | | | | | | |
| F4211-2 | Host Facilities And/Or Platforms | | | | | | | |

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) S&D Resource Allocation Criteria</div><div>2) S&D Requirements</div><div>3) Track File</div><div>4) Situation Data</div><div>5) System Status Data</div><div>6) Kill Assessment Observables Collection Requests</div></div> | <div>F4212 - ASSIGN AND TASK S&D RESOURCES</div> <div><div>Description: This function encompasses the processes and means to assign and task search volume coverage and object-specific collection requirements among the S&D resources in order to conduct surveillance and discrimination of the inflight threat objects. This function involves partitioning the search volume coverages among the S&D resources in order to obtain favorable viewing angles of the threat objects and to avoid saturation of the S&D resources during peak processing times. This may require the function to determine the status and capability of the S&D resources and the space/time distribution of inflight threat objects. Object-specific collection requirements include such parameters as detection thresholds, filtering algorithms, and coordinate conversions. It is also necessary to provide S&D activity reports to other SDS functions.</div><div><div>#</div><div>Requirement Description</div><div>F4212-1S&D Management Resources</div><div>F4212-1 2Host Facilities And/Or Platforms</div></div></div> | <div>OUTPUT</div> <div><div>1) S&D Resource Taskings</div><div>2) S&D Activity Reports</div></div> |
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INPUT

- 1) S&D Reporting Requirements
- 2) S&D Resource Taskings
- 3) Track File
- 4) Situation Data
- 5) System Status Data

F4213 - ASSIGN AND TASK OBJECT/EVENT DATA REPORTING

Description: This function encompasses the processes and means to assign and task the reporting of object and event data among the functions and elements of the SDS system in accordance with the S&D reporting requirements, S&D resource taskings, and situation and other data. This function involves partitioning the object/event data reporting tasks in order to avoid saturation of the SDS system resources during peak processing times. This may require the function to determine the availability and capability of communication and processing resources in the SDS system, as well as determine the required update rates and communication paths over which object and event data should be reported. It may also be necessary to provide alternate reporting paths in the event of damage or loss to communication and processing resources.

Requirement Description

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|---------|----------------------------------|
| F4213-1 | S&D Management Resources |
| F4213-2 | Host Facilities And/Or Platforms |

OUTPUT

- 1) S&D Object/Event Data Reporting Taskings

| <div>INPUT</div> <div><div>1) Criteria For Use Of Expendable S&D Assets</div><div>2) S&D Resource Taskings</div><div>3) S&D Activity Reports</div><div>4) Situation Data</div><div>5) Track File</div></div> | <div>F4214 - AUTHORIZE USE OF EXPENDABLE S&D ASSETS</div> <div><div>Description: This function encompasses the processes and means to provide authorization for use of expendable S&D assets based on the S&D resource taskings and in accordance with the criteria for use of expendable S&D assets and situation assessment. The function involves identifying expendable S&D resource taskings, verifying satisfaction of utilization criteria, and providing authority to release the assets if the criteria are satisfied. The expendable S&D asset release authority is not a specific S&D asset tasking or launch directive; rather, it is a form of positive control for use of the expendable S&D assets.</div><div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4214-1</td><td>S&D Management Personnel Computational Resources</td></tr><tr><td>F4214-2</td><td>Host Facilities And/Or Platforms</td></tr></table></div></div> | # | Requirement Description | F4214-1 | S&D Management Personnel Computational Resources | F4214-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div><div>1) Expendable S&D Asset Use Authorizations</div></div> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|--------------------------------------------------|---------|----------------------------------|----------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4214-1 | S&D Management Personnel Computational Resources | | | | | | | |
| F4214-2 | Host Facilities And/Or Platforms | | | | | | | |

| INPUT | F4215 - MAINTAIN CONTINUITY OF S&D MANAGEMENT | OUTPUT | | | | | | |
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| <div>1) System Mode Selection</div> <div>2) S&D Requirements</div> <div>3) S&D Reporting Requirements</div> <div>4) S&D Resource Taskings</div> <div>5) S&D Data Reporting Taskings</div> <div>6) Expendable S&D Asset Use Authorizations</div> <div>7) Situation Data</div> <div>8) Track File</div> | <div>Description: This function encompasses the processes and means to maintain continuity of the S&D management function in order to provide reliable control and tasking to the S&D resources based on the S&D control and taskings and in accordance with the system mode selection and situation and other data. The function involves monitoring the status of S&D management nodes, identifying the need for transfer of S&D management functions, transferring functions to successor nodes, and advising the SDS structure of the new S&D management relationships.</div> <div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4215-1</td><td>Nodes With The Capability To Assume The Critical Functions Of Primary S&D Management Nodes (Including Personnel And/Or Computational Resources As Applicable To The Functions Subject To Transfer)</td></tr><tr><td>F4215-2</td><td>Communications For Status Monitoring Among Primary And Alternate S&D Management Nodes</td></tr></table></div> | # | Requirement Description | F4215-1 | Nodes With The Capability To Assume The Critical Functions Of Primary S&D Management Nodes (Including Personnel And/Or Computational Resources As Applicable To The Functions Subject To Transfer) | F4215-2 | Communications For Status Monitoring Among Primary And Alternate S&D Management Nodes | <div>1) S&D Management Function Transfers</div> |
| # | Requirement Description | | | | | | | |
| F4215-1 | Nodes With The Capability To Assume The Critical Functions Of Primary S&D Management Nodes (Including Personnel And/Or Computational Resources As Applicable To The Functions Subject To Transfer) | | | | | | | |
| F4215-2 | Communications For Status Monitoring Among Primary And Alternate S&D Management Nodes | | | | | | | |

| <div>INPUT</div> <div><div>1) S&D Control And Tasking</div><div>2) Background Environment</div><div>3) Object/Event Observables</div><div>4) System Status Data</div></div> | <div>F422 - OBTAIN AND PROCESS OBSERVABLES</div> <div><div>Description: This function encompasses the processes and means to operate the S&D collection assets in order to obtain and process observables into time-tagged sensor measurement reports. The function includes activities such as aligning the S&D platform, pointing and activating interactive discrimination subsystems, collecting the radiometric observables, and bulk filtering extraneous observables required to generate the sensor measurement reports on objects and events. The sensor measurement reports, as generated by this function, are not associated with an object in the track file. However, they are platform dependent reports and require time tags and either platform location information or platform identification from which the platform location can be computed by user functions.</div><table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F422-1</td><td>S&D Collection Assets (Including At Least Sensors Subsystems, But Also Possible Interactive Discrimination Subsystems)</td></tr><tr><td>F422-2</td><td>Signal Processing/Bulk Filtering Components</td></tr><tr><td>F422-3</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table></div> | # | Requirement Description | F422-1 | S&D Collection Assets (Including At Least Sensors Subsystems, But Also Possible Interactive Discrimination Subsystems) | F422-2 | Signal Processing/Bulk Filtering Components | F422-3 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div><div>1) Time-tagged Sensor Measurements Reports (Of Objects And NUDET Events)</div></div> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|--------|------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------|--------|----------------------------------|------------------------------------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | |
| F422-1 | S&D Collection Assets (Including At Least Sensors Subsystems, But Also Possible Interactive Discrimination Subsystems) | | | | | | | | | |
| F422-2 | Signal Processing/Bulk Filtering Components | | | | | | | | | |
| F422-3 | Host Facilities And/Or Platforms | | | | | | | | | |

INPUT

- 1) Coverage taskings
- 2) System status data
- 3) Background environment
- 4) Time-tagged sensor measurements (of objects and NUDET events)

F4221 - OPERATE S&D COLLECTION ASSETS

Description: This function deals with those activities covering the operation of deployed S&D assets. It covers the tasking of search volumes and locations, the instructions to collect observable in a specific color band or frequency, the tasking of new sensor thresholds, the tasking of sensors to support specific events, i.e. NUDET observations, and the updating of on-board status and repair instructions.

| # | Requirement Description |
|---|-------------------------|
|---|-------------------------|

| | |
|---------|----------------------|
| F4221-1 | Communications |
| F4221-2 | Processing Resources |
| F4221-3 | Sensor Controls |
| F4221-4 | Maintenance |

OUTPUT

- 1) Sensor positions and viewing angles

| <p>INPUT</p> <p>1) Collection taskings 2) Sensor position and viewing angles 3) Object/event observables 4) Background environment</p> | <p>F4222 - COLLECT AND FILTER OBSERVABLES</p> <p>Description: This function deals with the bulk filtering of a single sensor data cluster from a single target and a single scan to determine whether the observable falls into a specific group of categories such as stars, thrusting boosters, new or old space debris, clusters of objects, RVs or replicas, etc.</p> <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4222-1</td><td>Active Sensor</td></tr><tr><td>F4222-2</td><td>NUDET Sensor</td></tr><tr><td>F4222-3</td><td>Data Storage</td></tr><tr><td>F4222-4</td><td>Computational Resources</td></tr><tr><td>F4222-5</td><td>Algorithms</td></tr></table> | # | Requirement Description | F4222-1 | Active Sensor | F4222-2 | NUDET Sensor | F4222-3 | Data Storage | F4222-4 | Computational Resources | F4222-5 | Algorithms | <p>OUTPUT</p> <p>1) Filtered observables data</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|---------------|---------|--------------|---------|--------------|---------|-------------------------|---------|------------|----------------------------------------------------------|
| # | Requirement Description | | | | | | | | | | | | | |
| F4222-1 | Active Sensor | | | | | | | | | | | | | |
| F4222-2 | NUDET Sensor | | | | | | | | | | | | | |
| F4222-3 | Data Storage | | | | | | | | | | | | | |
| F4222-4 | Computational Resources | | | | | | | | | | | | | |
| F4222-5 | Algorithms | | | | | | | | | | | | | |

INPUT

- 1) S&D data reporting taskings
- 2) Sensor position and viewing angles
- 3) Filtered observables data

F4223 - PROVIDE TIME-TAGGED SENSOR MEASUREMENTS

Description: This function deals with the activities of the sensor to provide event time, azimuth, elevation (in either inertial or geocentric coordinates), signal amplitudes in each of the sensor's spectral bands, and target class of observables.

| # | Requirement Description |
|---------|-------------------------|
| F4222-1 | Data Storage |
| F4222-2 | Computational Resources |
| F4222-3 | Clock |
| F4222-4 | Positioning Sensor |
| F4222-5 | Algorithms |

OUTPUT

- 1) Time-tagged sensor measurements (objects and NUDET events)

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <p>INPUT</p> <ol style="list-style-type: none"> 1) S&D Resource And Track Reporting Taskings 2) Time-tagged Sensor Measurements 3) Object Type And Status Estimates 4) System Status Data 5) Situation Data | <p>F423 - INITIATE AND MAINTAIN TRACK FILES</p> <p>Description: This function encompasses the processes and means to correlate, filter, and possibly fuse sensor measurements in order to develop state vector estimates and improve their accuracy and confidence. The function includes association and correlation of the sensor measurements, initiation and updates of the state vector estimates, and fusing of independently developed state vector estimates. It may also require removing redundant and extraneous sensor measurement reports and providing a consistent and timely means by which to update the fields of the track file in order that other SDS functions can be supplied with the necessary data. Data fields of the track file may include time tags, state vector estimates, launch point or parent track estimates, radiometric signature data, and other information as required by elements and functions of the SDS.</p> <p># <u>Requirement Description</u></p> <p>F423-1 Computational Resources</p> <p>F423-2 Host Facilities And/Or Platforms</p> | <p>OUTPUT</p> <ol style="list-style-type: none"> 1) Object/Cluster Track File |
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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) S&D Resource Taskings</div><div>2) System Status Data</div><div>3) Time-tagged Sensor Measurements</div><div>4) State Vector Estimates</div><div>5) Type And Status Estimates</div></div> | <div>F4231 - ASSOCIATE AND CORRELATE SENSOR MEASUREMENTS</div> <div><div>Description: This function encompasses the processes and means to perform data correlation of the time-tagged sensor measurements. This function includes frame-to-frame mono correlation, stereo correlation, resolving of unassociated sensor measurements, and filtering of extraneous observables, such as space debris. This requires associating single detection reports to an existing object/cluster track file and may require generating three-dimensional reports from the correlation of two or more measurements (e.g., for angle-only measurements). The function also accounts for the uncertainty in the origin of the measurements by forming gate regions around the extrapolated state estimate and assigning probabilities that a sensor measurement within the gate is correctly associated to the state estimate.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F4231-1</div><div>Computational Resources</div></div><div><div>F4231-2</div><div>Host Facilities And/Or Platforms</div></div></div> | <div>OUTPUT</div> <div><div>1) Correlated Measurements</div></div> |
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| <p>INPUT</p> <ol style="list-style-type: none"> 1) S&D Resource And Track Reporting Taskings 2) Correlated Measurements 3) Type And Status Estimates | <p>F4232 - ESTIMATE CLUSTER/OBJECT STATE VECTOR</p> <p>Description: This function encompasses the processes and means to provide object/cluster state vector and confidence interval estimates in order to facilitate the execution of other SDS functions. This function includes determining the appropriate state estimation algorithm, determining the state estimation parameters such as the transition matrix and model noise, and computing the updated state vector and confidence interval estimates. Potential state estimation algorithms include the Kalman filter and the iterative least squares parameters estimation. A cluster, as opposed to an object, is a synthetic location which represents the centroid of a group of observables in three space, such as an RV and its associated decoys.</p> <p># <u>Requirement Description</u></p> <p>F4232-1 Computational Resources</p> <p>F4232-2 Host Facilities And/Or Platforms</p> | <p>OUTPUT</p> <ol style="list-style-type: none"> 1) Object/Cluster State Vector (And Confidence Interval) Estimates |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|

INPUT

- 1) S&D Resource And Track Reporting Taskings
- 2) Object Track File
- 3) Object State Vector Estimates

F4233 - FUSE STATE VECTOR ESTIMATES

Description: This function encompasses the processes and means to merge state vector and confidence interval estimates when it is desired to improve the accuracy and confidence of the state vector estimates as compared to those developed by any single S&D element. This function includes determining the appropriate fusing algorithm, determining the fusing parameters, and computing the fused state vector and confidence interval estimates. Applicable fusion algorithms include filter algorithms which weight the state vector estimates according to their confidence levels and association algorithms which augment the correlation level of the state vector estimates.

Requirement Description

F4233-1 Computational Resources

F4233-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Fused State Estimates

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| <div>INPUT</div> <div><div>1) S&D Track Reporting And Resources Taskings</div><div>2) State Vector Estimates Or Fused State Vector Estimates</div><div>3) Type And Status Estimates</div><div>4) Time-tagged Sensor Measurements</div><div>5) Situation Data</div></div> | <div>F4234 - APPEND RELEVANT DATA TO TRACK FILE</div> <div><div>Description: This function encompasses the processes and means to initiate and maintain the entry of data into the cluster/object track file in order that the SDS functions can be supplied with the necessary and timely data. The track file can be defined as containing all the necessary cluster/object data that a set of SDS functions require to perform their objectives. By this definition the data fields of the track file can be permitted to vary among the SDS elements, as long as the data among the different track files is kept consistent. The objective of this function is to provide a consistent means with which to update the fields of the track file and to provide the SDS functions with the necessary cluster/object data required.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F4234-1</div><div>Computational Resources</div></div><div><div>F4234-2</div><div>Host Facilities And/Or Platforms</div></div></div> | <div>OUTPUT</div> <div><div>1) Updated Cluster/Object Track File</div></div> |
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INPUT

- 1) S&D Control And Tasking
- 2) S&D Resource Tasking
- 3) Discrimination, Kill Assessment, And NUDET Event Reporting Tasking
- 4) Object Track File
- 5) NUDET Sensor Measurements
- 6) Situation Data (Threat Order Of Battle)

F424 - CLASSIFY AND IDENTIFY OBJECTS/EVENTS

Description: This function encompasses the processes and means to provide object type/status estimates and NUDET event data. This function includes providing object launch point and parent track estimates, comparing radiometric signature data, comparing object trajectory data, estimating object type and status, and estimating NUDET burst locations and yields. This function also provides a means by which the threat technical and threat order of battle data can be updated and/or revised as new information and observations of the threat become available.

Requirement Description

F424-1 Computational Resources

F424-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Object Type And Status Estimates
- 2) NUDET Event Data

| <div>INPUT</div> <div><div>1) S&D Resource Taskings</div><div>2) Object Track File</div><div>3) Situation Data (Threat Order Of Battle)</div></div> | <div>F4241 - ESTIMATE LAUNCH POINT OR PARENT TRACK</div> <div><div>Description: This function encompasses the processes and means to provide launch point estimates for boost threat objects and parent track estimates for other inflight threat objects. This function includes determining the relevant estimation methods, computing the launch point and parent track estimates, and assessing the plausibility of launch point estimates. Launch point and parent track estimates are computed as soon as the relevant estimation methods have the required number of data points. The estimates are not continually updated since the estimates cannot be expected to improve as the threat objects travel further along their trajectory. The function also provides information required to update the threat order of battle data.</div><table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4241-1</td><td>Computational Resources</td></tr><tr><td>F4241-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table></div> | # | Requirement Description | F4241-1 | Computational Resources | F4241-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div><div>1) Launch Point And Parent Track Estimates</div></div> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4241-1 | Computational Resources | | | | | | | |
| F4241-2 | Host Facilities And/Or Platforms | | | | | | | |

| | | |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <div>INPUT</div> <div>1) S&D Control And Tasking 2) Object Track File</div> | <div>F4242 - COMPARE RADIOMETRIC DATA TO COLLATERAL DATA</div> <div>Description: This function encompasses the processes and means to provide object type and status estimates based on comparisons between radiometric data from sensor measurements and collateral signature data files. This function involves determining the relevant collateral data signature files and correlating the radiometric data to those data files in order to identify object type/status estimates or candidates. It also involves converting the radiometric data into formats that are appropriate for data correlation. This may require filtering of the estimates in order to avoid the accumulation of a large set of radiometric data on each object. In some instances, signature data files may not exist for particular combinations of threat objects and radiometric data. In these cases, the function may need to provide information for updates to the signature data file.</div> <div><div>#</div><div><u>Requirement Description</u></div></div> <div>F4242-1 Computational Resources</div> <div>F4242-2 Host Facilities And/Or Platforms</div> | <div>OUTPUT</div> <div>1) Object Type/Status Candidates</div> |
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| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <p>INPUT</p> <ol style="list-style-type: none"> 1) S&D Control And Tasking 2) Object Track File 3) Launch Point Or Parent Track Estimate | <p>F4243 - COMPARE OBJECT TRAJECTORY TO COLLATERAL DATA</p> <p>Description: This function encompasses the processes and means to provide object type and status estimates based on comparisons of object trajectory data and collateral trajectory data files. This function involves determining the relevant collateral trajectory data files and correlating the object data to the trajectory data files. The trajectory correlations include position and velocity discriminants, as well as acceleration discriminants, such as the ballistic coefficient and maneuvering forces. In some instances, collateral trajectory data may not exist for particular threat objects flying depressed, maneuvering, fast-burn or other unfamiliar trajectories. In these cases the function may need to provide information for updates to the collateral trajectory data file.</p> <p># <u>Requirement Description</u></p> <p>F4243-1 Computational Resources</p> <p>F4243-2 Host Facilities And/Or Platforms</p> | <p>OUTPUT</p> <ol style="list-style-type: none"> 1) Object Type/Status Candidates |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|

INPUT

- 1) S&D Control And Tasking
- 2) Discrimination And Kill Assessment Reporting Taskings
- 3) S&D Resource Taskings
- 4) Object Type And Status Candidates
- 5) Launch Point Or Parent Track Estimates
- 6) Situation Data (Threat O.B.)

F4244 - ESTIMATE OBJECT TYPE AND STATUS

Description: This function encompasses the processes and means to provide other SDS functions with a consistent cumulative set of object type/status estimates based on an accumulation of the launch point or parent track estimates and previously developed object type and status candidates. This function involves merging and fusing all relevant object type and status estimates, as well as estimating the time at which the object transitioned to its current status.

Requirement Description

F4244-1 Computational Resources

F4244-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Object Type And Status Estimates

| <p>INPUT</p> <p>1) S&D Control And Tasking 2) NUDET Event Reporting Taskings 3) NUDET Sensor Measurements 4) Situation Data</p> | <p>F4245 - ESTIMATE NUDET PARAMETERS</p> <p>Description: This function encompasses the processes and means to provide nuclear detonation (NUDET) event data based on NUDET sensor measurements and in accordance with S&D resource and reporting taskings. This function involves correlating the sensor measurement reports to estimate the position and time of the NUDETs, as well as use of the radiometric data to estimate the yield of the NUDET bursts. It is also necessary to associate NUDET detections to potential threat objects in the object track file in order to provide birth-to-death tracking of threat objects, and to provide further information with which to estimate yield of burst.</p> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4245-1</td><td>Computational Resources</td></tr><tr><td>F4245-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table> | # | Requirement Description | F4245-1 | Computational Resources | F4245-2 | Host Facilities And/Or Platforms | <p>OUTPUT</p> <p>1) NUDET Event Data</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4245-1 | Computational Resources | | | | | | | |
| F4245-2 | Host Facilities And/Or Platforms | | | | | | | |

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Expendable S&D Taskings</div><div>2) Expendable S&D Asset Use Authorization</div><div>3) Object Track File</div><div>4) Situation Data</div></div> | <div>F425 - EMPLOY EXPENDABLE SURVEILLANCE AND DISCRIMINATION ASSETS</div> <div><div>Description: This function encompasses the processes and means to employ expendable S&D assets of the SDS in order to provide primary or augmentation means to obtain, filter, and/or process observables of interest into time-tagged sensor measurement reports. The function includes preparation of the S&D asset, delivery of the S&D asset to the desired location/volume for operation, and activation of the expendable S&D asset and its reporting. It does not include the actual collection, processing, and delivery of time-tagged sensor measurements, since these processes are part of function F422, Obtain and Process Observables.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F425-1</div><div>Expendable S&D Assets</div></div><div><div>F425-2</div><div>Asset Delivery Subsystems</div></div><div><div>F425-3</div><div>Asset And Delivery Subsystem Storage And Support Facilities And/Or Platforms</div></div><div><div>F425-4</div><div>Asset And Delivery Subsystem Preparation Means</div></div><div><div>F425-5</div><div>Asset Activation Means</div></div></div> | <div>OUTPUT</div> <div><div>1) S&D Expenditure Reports</div><div>2) Expendable S&D Asset Activations</div></div> |
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| <div>INPUT</div> <div>1) Expendable S&D asset tasking 2) Track file 3) Situation data</div> | <div>F4251 - PREPARE S&D ASSETS FOR EMPLOYMENT</div> <div>Description: This function encompasses all the activities leading up to the launch of expendable S&D assets. This function includes the loading of instructions and taskings through the loading of expendable items, i.e. coolants, fuels, etc. This function also deals with the process of acquiring a launch vehicle, the mating of payloads, the prelaunch testing, and the orientation of the launch vehicle prior to launch.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4251-1</td><td>Launch Facilities</td></tr><tr><td>F4251-2</td><td>S&D Assets</td></tr><tr><td>F4251-3</td><td>Expendables</td></tr><tr><td>F4251-4</td><td>Maintenance and Testing</td></tr><tr><td>F4251-5</td><td>Storage</td></tr></tbody></table> | # | Requirement Description | F4251-1 | Launch Facilities | F4251-2 | S&D Assets | F4251-3 | Expendables | F4251-4 | Maintenance and Testing | F4251-5 | Storage | <div>OUTPUT</div> <div>1) Prepared expendable S&D assets</div> |
|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------|---------|------------|---------|-------------|---------|-------------------------|---------|---------|--------------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | | | | | |
| F4251-1 | Launch Facilities | | | | | | | | | | | | | |
| F4251-2 | S&D Assets | | | | | | | | | | | | | |
| F4251-3 | Expendables | | | | | | | | | | | | | |
| F4251-4 | Maintenance and Testing | | | | | | | | | | | | | |
| F4251-5 | Storage | | | | | | | | | | | | | |

INPUT

- 1) Prepared expendable S&D asset
- 2) Expendable S&D asset use authorization
- 3) Situation data

F4252 - DELIVER S&D ASSET TO LOCATION/ VOLUME FOR OPERATION

Description: This function encompasses all the activities commencing with the launch of the S&D asset through the command guidance of the sensor to its assigned location ormspace surveillance volume

| <u>#</u> | <u>Requirement Description</u> |
|----------|--------------------------------|
| F5252-1 | Tracking Facility |
| F4252-1 | Communications |

OUTPUT

- 1) S&D expenditure reports
- 2) On station expendable S&D assets

INPUT

- 1) On station expendable S&D assets
- 2) Situation data

F4253 - ACTIVATE S&D ASSET AND REPORTING

Description: This function encompasses all the activities commencing with the arrival of the S&D asset to its assigned location or space surveillance volume. This function deals with the activation of the sensor subsystems and the monitoring of data received from the activated sensor and future sensor taskings and instructions.

| <u>#</u> | <u>Requirement Description</u> |
|----------|--------------------------------|
| F4253-1 | Tracking Facility |
| F4253-2 | Communications |
| F4253-3 | Sensor Analysis |
| F4253-4 | Battle Management |

OUTPUT

- 1) Expendable S&D asset activations

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| <div>INPUT</div> <div><div>1) Approved Decision Aids And Validated Procedures</div><div>2) Intelligence And Friendly Force Reports</div><div>3) System Status Data</div><div>4) Object/Event Data</div><div>5) Battle Data (S&D And Engagement Activity Reports)</div></div> | <div>F43 - MONITOR AND ASSESS SITUATION</div> <div><div>Description: This high level function encompasses processes and means to provide situation data, warnings, and assessments in support of other SDS functions and external users, including release of object and event data to external users. The function includes assessing the threat force status, determining the existence of an attack, determining the assets and land areas at risk, evaluating the battle situation, and determining the status of defended assets which includes SDS assets.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F43-1</div><div>Threat Assessment Analysts</div></div><div><div>F43-2</div><div>Computational Resources</div></div><div><div>F43-3</div><div>Host Facilities And Platforms</div></div><div><div>F43-4</div><div>Communications And Interfaces To Other Functions Of The Employ SDS Function</div></div></div> | <div>OUTPUT</div> <div><div>1) Warning And Assessment Reports</div><div>2) Situation Data</div><div>3) Object/Event Data Released To External Users</div></div> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <div>INPUT</div> <div><div>1) Decision Aids And Procedures</div><div>2) Intelligence Reports</div><div>3) Object/Event Data</div></div> | <div>F431 - ASSESS THREAT FORCE STATUS</div> <div><div>Description: This function encompasses the processes and means to accumulate, assess, and revise associated collateral databases of information on threat force status. The function includes assessing threat performance characteristics, updating threat order of battle data (O.B.), assessing indications and warning (I&W) information, and assessing overall risk measures.</div><div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F431-1</td><td>Threat Analysts</td></tr><tr><td>F431-2</td><td>Computational Resources</td></tr><tr><td>F431-3</td><td>Host Facilities And Platforms</td></tr></table></div></div> | # | Requirement Description | F431-1 | Threat Analysts | F431-2 | Computational Resources | F431-3 | Host Facilities And Platforms | <div>OUTPUT</div> <div><div>1) Threat Evaluation</div><div>2) Threat Performance Data</div><div>3) Threat O.B. Data</div><div>4) Assessed Risk Of Attack</div></div> |
|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|--------|-----------------|--------|-------------------------|--------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | |
| F431-1 | Threat Analysts | | | | | | | | | |
| F431-2 | Computational Resources | | | | | | | | | |
| F431-3 | Host Facilities And Platforms | | | | | | | | | |

| <div>INPUT</div> <div><div>1) Decision Aids And Procedures</div><div>2) Intelligence Reports</div><div>3) Object/Event Data</div></div> | <div>F4311 - ASSESS THREAT PERFORMANCE CHARACTERISTICS</div> <div><div>Description: This function encompasses the processes and means to revise/update collateral information and databases of threat performance characteristics. The function involves obtaining threat technical data from the intelligence community, obtaining threat data from SDS sensor observations, assessing threat performance characteristics bases on the data obtained, and revising/updating threat performance databases.</div><table><thead><tr><th>#</th><th><u>Requirement Description</u></th></tr></thead><tbody><tr><td>F4311-1</td><td>Threat Scientific And Technical (S&T) Analysts</td></tr><tr><td>F4311-2</td><td>Analytical Tools And Simulation Capabilities</td></tr><tr><td>F4311-3</td><td>Real-time Computational Resources (Optional)</td></tr><tr><td>F4311-4</td><td>Host Facilities (And Optional Platforms)</td></tr></tbody></table></div> | # | <u>Requirement Description</u> | F4311-1 | Threat Scientific And Technical (S&T) Analysts | F4311-2 | Analytical Tools And Simulation Capabilities | F4311-3 | Real-time Computational Resources (Optional) | F4311-4 | Host Facilities (And Optional Platforms) | <div>OUTPUT</div> <div><div>1) Threat Performance Data (And Associated Portions Of Threat Evaluations)</div></div> |
|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|---------|------------------------------------------------|---------|----------------------------------------------|---------|----------------------------------------------|---------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | | | | | | | |
| F4311-1 | Threat Scientific And Technical (S&T) Analysts | | | | | | | | | | | |
| F4311-2 | Analytical Tools And Simulation Capabilities | | | | | | | | | | | |
| F4311-3 | Real-time Computational Resources (Optional) | | | | | | | | | | | |
| F4311-4 | Host Facilities (And Optional Platforms) | | | | | | | | | | | |

| <p>INPUT</p> <p>1) Decision Aids And Procedures 2) Intelligence Reports 3) Object/Event Data</p> | <p>F4312 - UPDATE THREAT ORDER OF BATTLE</p> <p>Description: This function encompasses the processes and means to revise/update information and databases of the threat missile, space, and defense suppression system orders of battle, including quantities by type, positions, operational statuses, command and control relationships, and other relevant O.B. type data. The function involves obtaining threat O.B. data from the intelligence community, receiving launch point estimates and associations from other SDS functions, extracting threat space O.B. from the track file, optionally assessing damage expectancies of threat ground installations from friendly force retaliatory strikes, and revising/updating the threat O.B. information held by the SDS.</p> <table> <tr> <th>#</th><th>Requirement Description</th></tr> <tr> <td>F4312-1</td><td>Threat O.B. Analysts</td></tr> <tr> <td>F4312-2</td><td>Real-time Computational Resources</td></tr> <tr> <td>F4312-3</td><td>Host Facilities And/Or Platforms</td></tr> </table> | # | Requirement Description | F4312-1 | Threat O.B. Analysts | F4312-2 | Real-time Computational Resources | F4312-3 | Host Facilities And/Or Platforms |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|----------------------|---------|-----------------------------------|---------|----------------------------------|
| # | Requirement Description | | | | | | | | |
| F4312-1 | Threat O.B. Analysts | | | | | | | | |
| F4312-2 | Real-time Computational Resources | | | | | | | | |
| F4312-3 | Host Facilities And/Or Platforms | | | | | | | | |
| | <p>OUTPUT</p> <p>1) Threat O.B. Data (And The Associated Portions Of Threat Evaluations)</p> | | | | | | | | |

INPUT

- 1) Decision Aids And Procedures
- 2) Threat O.B. Data
- 3) Intelligence Reports
- 4) Object/Event Data

F4313 - ASSESS I&W INFORMATION

Description: This function encompasses the processes and means to obtain and fuse indications and warning information to support assessment of risk measures. The function involves obtaining I&W information from the intelligence community, obtaining space object I&W information directly from the object/event data, and fusing the information to increase confidence levels as compared to the confidence inherent in any single indication.

| # | Requirement Description |
|---------|-----------------------------------------|
| F4313-1 | I&W Analysts |
| F4313-2 | I&W Cell And Associated Host Facilities |
| F4313-3 | Computational Resources |

OUTPUT

- 1) Fused I&W Data

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Decision Aids And Procedures</div><div>2) Fused I&W Data</div><div>3) Threat O.B. Data</div><div>4) Threat Performance Data</div></div> | <div>F4314 - ASSESS RISK MEASURES</div> <div><div>Description: This function encompasses the processes and means to determine the likelihood of conflict or conflict escalation and to provide associated risk assessments to support decisions to elevate the SDS alert status and/or to provide another basis for corroboration of real-time indications of an attack. The function involves determining the likelihood of imminent attack, determining the likelihood of conflict escalation, estimating the consequences of an attack or escalation, and providing associated risk assessment reports.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F4314-1</div><div>Situation Assessment Analysts</div></div><div><div>F4314-2</div><div>Host Facilities</div></div></div> | <div>OUTPUT</div> <div><div>1) Assessed Risk Of Attack (Or Conflict Escalation)</div></div> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|

INPUT

- 1) Decision Aids And Procedures
- 2) System Status Data
- 3) Object/Event Data
- 4) Assessed Risk Of Attack
- 5) Reported Hostilities (Friendly Force Reports)

F432 - DETERMINE EXISTENCE OF ATTACK

Description: This function encompasses the processes and means to identify and confirm the existence of a defense suppression and/or ballistic missile attack in order to support decisions to enable countermeasure and/or engagement actions and to provide warning of attack to external users. The function includes determining the existence of a covert suppression attack, determining the existence of an overt suppression attack, determining the existence of a ballistic missile attack, and confirming NUDET sightings.

Requirement Description

| | |
|--------|------------------------------------------------|
| F432-1 | Attack Assessment Analysts |
| F432-2 | Man-machine Interfaces For Information Display |
| F432-3 | Computational Resources |
| F432-4 | Host Facilities |

OUTPUT

- 1) Warning Of Attack (To Include Nature And Scope)

| <div>INPUT</div> <div>1) Decision Aids And Procedures 2) System Status Data 3) Object/Event Data 4) Reported Hostilities</div> | <div>F4321 - DETERMINE EXISTENCE OF COVERT SUPPRESSION ATTACK</div> <div>Description: This function encompasses the processes and means to determine if there is or has been a covert attack on the SDS or portions thereof. The function involves monitoring system status data reporting, isolating suspicious system outages and malfunctions, formulating hypotheses as to causes, obtaining available corroborative information, assessing or testing the validity of the hypotheses, and rendering a determination as to the existence of a covert suppression attack.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4321-1</td><td>SDS System/Operation Analysts</td></tr><tr><td>F4321-2</td><td>System Diagnosis Means</td></tr><tr><td>F4321-3</td><td>Hypothesis Assessment/Testing Tools</td></tr><tr><td>F4321-4</td><td>Host Facilities And Platforms</td></tr></tbody></table> | # | Requirement Description | F4321-1 | SDS System/Operation Analysts | F4321-2 | System Diagnosis Means | F4321-3 | Hypothesis Assessment/Testing Tools | F4321-4 | Host Facilities And Platforms | <div>OUTPUT</div> <div>1) Identified Covert Suppression Attack(S)</div> |
|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------------|---------|------------------------|---------|-------------------------------------|---------|-------------------------------|-------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | | | |
| F4321-1 | SDS System/Operation Analysts | | | | | | | | | | | |
| F4321-2 | System Diagnosis Means | | | | | | | | | | | |
| F4321-3 | Hypothesis Assessment/Testing Tools | | | | | | | | | | | |
| F4321-4 | Host Facilities And Platforms | | | | | | | | | | | |

INPUT

- 1) Decision Aids And Procedures
- 2) Object/Event Data
- 3) System Status Data
- 4) Assessed Risk Of Attack
- 5) Reported Hostilities
- 6) Identified Covert Suppression Attack
- 7) Identified Ballistic Missile Attack
- 8) Confirmation Of NUDET Sightings

F4322 - DETERMINE EXISTENCE OF OVERT SUPPRESSION ATTACK

Description: This function encompasses the processes and means to identify and confirm the existence of an overt suppression attack against the SDS. The function involves monitoring initial indicators of an overt suppression attack, identifying indications of hostile suppression actions, weighing available supporting evidence when needed, rendering a determination of an overt suppression attack, and characterizing the nature/scope of the suppression attack.

Requirement Description

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|---------|---------------------------------------------------|
| F4322-1 | Attack Assessment Analysts |
| F4322-2 | Man-machine Interfaces For Displaying Information |
| F4322-3 | Computational Resources |
| F4322-4 | Host Facilities |

OUTPUT

- 1) Identified Overt Suppression Attack

| <div>INPUT</div> <div><div><div>1) Decision Aids And Procedures</div><div>2) Object/Event Data</div><div>3) Assessed Risk Of Attack</div><div>4) Reported Hostilities</div><div>5) Identified Covert Suppression Attack</div><div>6) Identified Overt Suppression Attack</div><div>7) Confirmation Of NUDET Sightings</div></div></div> | <div>F4323 - DETERMINE EXISTENCE OF BALLISTIC MISSILE ATTACK</div> <div><div>Description: This function encompasses the processes and means to identify the existence and characterize the size of a ballistic missile attack. The function involves monitoring object/event data reporting, identifying launch (or boost) of nuclear-capable foreign missile(s), weighing available supporting evidence, rendering a determination of a ballistic missile attack, and characterizing the size of the attack. The function is performed regardless of whether or not the United States is the target of the attack, i.e., the function is only concerned with determining the existence of a ballistic missile attack.</div><div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4323-1</td><td>Attack Assessment Analysts</td></tr><tr><td>F4323-2</td><td>Man-machine Interface For Information Display</td></tr><tr><td>F4323-3</td><td>Computational Resources</td></tr><tr><td>F4323-4</td><td>Host Facilities</td></tr></table></div></div> | # | Requirement Description | F4323-1 | Attack Assessment Analysts | F4323-2 | Man-machine Interface For Information Display | F4323-3 | Computational Resources | F4323-4 | Host Facilities | <div>OUTPUT</div> <div><div>1) Identified Ballistic Missile Attack</div></div> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|----------------------------|---------|-----------------------------------------------|---------|-------------------------|---------|-----------------|--------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | | | |
| F4323-1 | Attack Assessment Analysts | | | | | | | | | | | |
| F4323-2 | Man-machine Interface For Information Display | | | | | | | | | | | |
| F4323-3 | Computational Resources | | | | | | | | | | | |
| F4323-4 | Host Facilities | | | | | | | | | | | |

INPUT

- 1) Decision Aids And Procedures
- 2) Object/Event Data
- 3) Reported Hostilities
- 4) Identified Overt Suppression Attack
- 5) Identified Ballistic Missile Attack

F4324 - CONFIRM NUDET SIGHTINGS

Description: This function encompasses the processes and means to confirm and characterize the numbers and timing of nuclear detonations in order to indicate or corroborate the existence of a defense suppression and/or ballistic missile attack. The function involves monitoring NUDET event data reporting in the SDS system, corroborating system NUDET reports when needed, rendering a confirmation of NUDET event(s), and characterizing the numbers and timing of NUDETs.

| # | Requirement Description |
|---------|-------------------------|
| F4324-1 | Situation Analysts |
| F4324-2 | Computational Resources |
| F4324-3 | Host Facilities |

OUTPUT

- 1) Confirmation Of NUDET Sightings

| INPUT | F433 - DETERMINE ASSETS/AREAS AT RISK | OUTPUT | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------|--------|-------------------------|--------|----------------------------------|------------------------------------------|
| <div>1) Decision Aids And Procedures</div> <div>2) Defended Asset Status</div> <div>3) Threat O.B. And Performance Data</div> <div>4) Warning Of Attack</div> <div>5) Object/Event Data (Track File)</div> | <div><div>Description: This function encompasses the processes and means to identify by threat object the asset(s) or area(s) it is placing at risk. Assets include SDS platforms and installations, as well as other defended assets in the United States and Allied countries, and in space. The function includes projecting friendly asset positions, projecting threat object envelopes, computing closest approach distances, and comparing those distances to vulnerable radii of the assets. The function is performed before launch or commit of the threat objects to identify the full range of assets/areas which it could attack (i.e., SDS space platforms or other friendly satellites in the case of ASAT threat systems, and land areas in the case of ballistic missiles), as well as in each phase of the object's flight after launch, in order to support assignment of values to objects for engagement (or weapons withhold) and to support attack assessment. Since the envelope of the threat object will narrow after commit, and the SDS system's accuracy in predicting the trajectory of the threat object will improve with phase of flight and number of position measurements obtained, the function should result in successively better resolution in the asset/area at risk prediction.</div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F433-1</td><td>Computational Resources</td></tr><tr><td>F433-2</td><td>Host Facilities And/Or Platforms</td></tr></table></div> | # | Requirement Description | F433-1 | Computational Resources | F433-2 | Host Facilities And/Or Platforms | <div>1) Threat Versus Assets/Areas</div> |
| # | Requirement Description | | | | | | | |
| F433-1 | Computational Resources | | | | | | | |
| F433-2 | Host Facilities And/Or Platforms | | | | | | | |

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|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <p>INPUT</p> <p>1) Decision Aids And Procedures 2) Asset Positions/Motions</p> | <p>F4331 - PROJECT FRIENDLY ASSET POSITIONS</p> <p>Description: This function encompasses the processes and means to project the positions of friendly assets into the future in order to support determination of potential closest approach distances to threat objects. The function involves identifying state estimates for friendly assets, determining the state extrapolation method, and actual extrapolating of the friendly asset locations over time out to some appropriate planning window. Note that even "fixed" assets will have motion in an inertial reference frame, and therefore must have their positions projected in that reference frame. In this context, the word "assets" includes land areas.</p> <p># <u>Requirement Description</u></p> <p>F4331-1 Computational Resources</p> <p>F4331-2 Host Facilities And/Or Platforms</p> | <p>OUTPUT</p> <p>1) Projected Friendly Asset Positions</p> |
|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|

INPUT

- 1) Decision aids and procedures
- 2) Threat O.B. data
- 3) Warning of attack
- 4) Object/event data (track file)
- 5) Threat performance data

F4332 - PROJECT THREAT OBJECT ENVELOPES

Description: This function encompasses the processes and means to estimate/project threat object envelopes in order to support determination of closest approach distances to assets/areas. The function involves identifying the threat object state estimate (from the threat O.B. database or from the track file), determining the appropriate state extrapolation method, and extrapolating of the threat object trajectory/envelope. For uncommitted threat objects, this will be the threat system's precommit envelope associated with its launch site or platform location (though this could be refined if there were reliable a priori information about the specific targets against which it is assigned). For inflight threat objects, this will be the expected trajectory and some confidence bound around that expected trajectory, i.e., the threat tube.

| # | Requirement Description |
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| F4332-1 | Computational resources |
|---------|-------------------------|

| | |
|---------|----------------------------------|
| F4332-2 | Host facilities and/or platforms |
|---------|----------------------------------|

OUTPUT

- 1) Areas at risk
- 2) Threat trajectories/envelopes

INPUT

- 1) Decision Aids And Procedures
- 2) Projected Friendly Asset Positions
- 3) Threat Trajectories/Envelopes

F4333 - COMPUTE CLOSEST APPROACH DISTANCES

Description: This function encompasses the processes and means to determine closest approach distances between friendly assets and threat objects based on the projected positions and trajectories/envelopes of each, respectively. The function involves comparing threat trajectories/envelopes to friendly asset projected positions, computing distances over time, and determining the minimum distances between a threat object's expected trajectory and all the assets within (or which enter) its envelope.

Requirement Description

F4333-1 Computational Resources

F4333-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Closest Approach Distances

| <div>INPUT</div> <div><div>1) Decision Aids And Procedures</div><div>2) Asset Vulnerability Data</div><div>3) Threat Performance Data</div><div>4) Closest Approach Distances</div></div> | <div>F4334 - COMPARE DISTANCES TO VULNERABLE RADII</div> <div><div>Description: This function encompasses the processes and means to determine the specific asset(s) at risk from a threat object based on closest approach distance(s) and radii of vulnerability of the asset(s) to the threat object. The function involves assessing friendly asset vulnerable radii (e.g., sure-safe and sure-kill radii) to the estimated destructive power/performance of the threat object, comparing the vulnerable radii to the closest approach distance, determining the expected degree of risk to the friendly asset, and disseminating friendly asset risk reports.</div><table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4334-1</td><td>Computational Resources</td></tr><tr><td>F4334-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table></div> | # | Requirement Description | F4334-1 | Computational Resources | F4334-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div><div>1) Assets At Risk (Including Degree Of Risk And Threat Object Or Objects Causing The Risk)</div></div> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4334-1 | Computational Resources | | | | | | | |
| F4334-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Decision Aids And Procedures
- 2) Threats Versus Assets/Areas
- 3) Battle Data (S&D And Engagement Activity Reports)
- 4) Object/Event Data (Track File)
- 5) Threat O.B. And Performance
- 6) System Status Data

F434 - EVALUATE BATTLE SITUATION

Description: This function encompasses the processes and means to perform real-time monitoring, assessment, and evaluation of the battle situation to support both decisionmaking and automated battle management. The function includes inferring the attack objectives, monitoring battle activities, performing target kill assessment, estimating aggregate system performance, characterizing the remaining threat, and characterizing the current system capability. As a part of these activities, the function provides information to enhance attack assessment reporting and serves as the control for release of object/event data to external users.

Requirement Description

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|--------|------------------------------------------------|
| F434-1 | Battle Situation Analysts |
| F434-2 | Man-machine Interfaces For Information Display |
| F434-3 | Computational Resources |
| F434-4 | Host Facilities And Platforms |

OUTPUT

- 1) Inferred Attack Objectives (Becomes A Part Of The Attack Assessment)
- 2) Object/Event Data (To Track File And To External Users)
- 3) System And Threat Effectiveness And Capability Assessments (I.E., Aggregate System Performance, Remaining Threat Capability, And Current System Capability)

| <div>INPUT</div> <div>1) Decision Aids And Procedures 2) Threats Versus Assets/Areas 3) Remaining Threat Capability</div> | <div>F4341 - INFER ATTACK OBJECTIVES</div> <div>Description: This function encompasses the processes and means to arrive at a best estimate of the objectives the attacker is attempting to achieve in the unfolding attack, in order to support HA decision making relative to employment of other forces and to provide a basis (with other factors) for revisions of defense preferences. The function involves summarizing the nature and scope of the attack, including threat numbers and timing , as well as assets and functions under attack; summarizing the threat force not yet committed, including defense suppression assets, ballistic missiles, and associated O.B.; assessing possible intentions (unauthorized launch, suppression-only attack, third party attack only, counterforce versus countervalue, etc.), and rendering a best estimate as to the attack objectives.</div> <div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4341-1</td><td>Situation Assessment Analysts</td></tr><tr><td>F4341-2</td><td>Man-machine Interface For Information Display</td></tr><tr><td>F4341-3</td><td>Computational Resources</td></tr><tr><td>F4341-4</td><td>Host Facilities</td></tr></table></div> | # | Requirement Description | F4341-1 | Situation Assessment Analysts | F4341-2 | Man-machine Interface For Information Display | F4341-3 | Computational Resources | F4341-4 | Host Facilities | <div>OUTPUT</div> <div>1) Attack Objectives</div> |
|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------------|---------|-----------------------------------------------|---------|-------------------------|---------|-----------------|---------------------------------------------------|
| # | Requirement Description | | | | | | | | | | | |
| F4341-1 | Situation Assessment Analysts | | | | | | | | | | | |
| F4341-2 | Man-machine Interface For Information Display | | | | | | | | | | | |
| F4341-3 | Computational Resources | | | | | | | | | | | |
| F4341-4 | Host Facilities | | | | | | | | | | | |

INPUT

- 1) Decision Aids And Procedures
- 2) System Status Data
- 3) Battle Data (S&D And Engagement Activities)

F4342 - MONITOR BATTLE ACTIVITIES

Description: This function encompasses the processes and means to monitor and summarize the real-time battle activities in order to provide requisite data to support kill assessment, estimation of aggregate system performance, and characterization of the current system capability. The function involves monitoring system status reporting, monitoring S&D activities, monitoring engagement activities, and summarizing the system asset activities as needed to support other SDS functions.

| # | Requirement Description |
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| F4342-1 | Computational Resources |
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| | |
|---------|--------------------------------------------|
| F4342-2 | Situation Analysts And Displays (Optional) |
|---------|--------------------------------------------|

| | |
|---------|----------------------------------|
| F4342-3 | Host Facilities And/Or Platforms |
|---------|----------------------------------|

OUTPUT

- 1) System Asset Activity Information And Summaries

| <div>INPUT</div> <div>1) Decision Aids And Procedures 2) System Asset Activity 3) Object/Event Data (Track File)</div> | <div>F4343 - PERFORM TARGET KILL ASSESSMENT</div> <div>Description: This function encompasses the processes and means to develop best estimates of target kill probabilities based on both system asset activity data and object/event data. For each credible threat object, the function involves identifying the S&D threat status estimate, determining if the system responded to the threat, comparing the S&D estimate of the system response information, and fusing the a priori and S&D kill probability estimates to form a best estimate. (Note that it is possible that the S&D estimate of object status might indicate that the threat has been destroyed, but the system has not engaged it, in which case the threat may have failed on its own or the S&D estimate may be false.) Since the assessments performed by this function validate and improve upon the object/event data reporting of the S&D elements, the function serves as a control for release of object/event data to external users and for update of the object status data contained in the track file.</div> <div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4343-1</td><td>Computational Resources</td></tr><tr><td>F4343-2</td><td>Host Facilities And/Or Platforms</td></tr></table></div> | # | Requirement Description | F4343-1 | Computational Resources | F4343-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div>1) Assessed Killed And Live Threat Objects</div> |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|-------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4343-1 | Computational Resources | | | | | | | |
| F4343-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Decision Aids And Procedures
- 2) System Asset Activity
- 3) Assessed Killed And Live
- 4) Threat Objects
- 5) Object/Event Data (Track File)
System Status Data

F4344 - ESTIMATE AGGREGATE PERFORMANCE

Description: This function encompasses the processes and means to estimate aggregate performance measures relevant for decision making and the higher level battle management functions. The function involves determining intercept rates by weapon and target types, leakage rates by engagement phase, unexploited engagement opportunity rates, and attrition rates by system asset type, as needed by the served decision making and battle management functions.

| # | Requirement Description |
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|---|-------------------------|

| | |
|---------|-------------------------|
| F4344-1 | Computational Resources |
|---------|-------------------------|

| | |
|---------|--------------------------------------------|
| F4344-2 | Situation Analysts And Displays (Optional) |
|---------|--------------------------------------------|

| | |
|---------|----------------------------------|
| F4344-3 | Host Facilities And/Or Platforms |
|---------|----------------------------------|

OUTPUT

- 1) Aggregate System
Performance Estimates

| <p>INPUT</p> <p>1) Decision Aids And Procedures</p> <p>2) Assessed Killed And Live Threat Objects</p> <p>3) Threats Versus Assets/Areas</p> <p>4) Threat O.B. And Performance</p> | <p>F4345 - CHARACTERIZE REMAINING THREAT</p> <p>Description: This function encompasses the processes and means to characterize the remaining threat to support the process of inferring the attack objectives, as well as high level battle management functions, such as selection/reselection of engagement strategy and tactics options. The function involves summarizing inflight threat objects, assets still at immediate risk, the uncommitted threat arsenal, and the damage capability of the uncommitted threat, all in a forms appropriate to the using SDS functions.</p> <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4345-1</td><td>Computational Resources</td></tr><tr><td>F4345-2</td><td>Situation Analysts And Displays (Optional)</td></tr><tr><td>F4345-3</td><td>Host Facilities And/Or Platforms</td></tr></table> | # | Requirement Description | F4345-1 | Computational Resources | F4345-2 | Situation Analysts And Displays (Optional) | F4345-3 | Host Facilities And/Or Platforms | <p>OUTPUT</p> <p>1) Remaining Threat Capability</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|--------------------------------------------|---------|----------------------------------|------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | |
| F4345-1 | Computational Resources | | | | | | | | | |
| F4345-2 | Situation Analysts And Displays (Optional) | | | | | | | | | |
| F4345-3 | Host Facilities And/Or Platforms | | | | | | | | | |

INPUT

- 1) Decision Aids And Procedures
- 2) System Status Data
- 3) System Asset Activities
- 4) Aggregate System Performance
- 5) Inferred Attack Objectives

F4346 - CHARACTERIZE CURRENT SYSTEM CAPABILITY

Description: This function encompasses the processes and means to characterize the current capability of the SDS to achieve its mission requirements and to deny the attack objectives, in order to support decision making and higher level battle management functions. The function involves determining the status and availability of system resources, determining the battle losses and expenditures, predicting future system performance, and estimating the capability to deny the inferred attack objectives.

Requirement Description

- | | |
|---------|--------------------------------------------|
| F4346-1 | Situation Analysts And Displays (Optional) |
| F4346-2 | Computational Resources |
| F4346-3 | Host Facilities And/Or Platforms |

OUTPUT

- 1) Current System Capability

| <p>INPUT</p> <p>1) Decision Aids And Procedures 2) Friendly Force Reports 3) System Status Data 4) Battle Data (S&D And Engagement Activity Reports) 5) Threats Versus Assets/Areas 6) Object/Event Data (Track File And NUDETs)</p> | <p>F435 - DETERMINE DEFENDED ASSET STATUS</p> <p>Description: This function encompasses the processes and means to determine the current activities, vulnerabilities, and survival of defended assets, including SDS assets, in order to support implementation of various forms of engagement strategies and tactics, particularly preferential defense and self defense strategies/tactics. The function includes monitoring defended asset status data reporting, computing or inferring damage expectancies, and updating the defended asset data.</p> <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F435-1</td><td>Computational Resources</td></tr><tr><td>F435-2</td><td>Host Facilities And/Or Platforms</td></tr></table> | # | <u>Requirement Description</u> | F435-1 | Computational Resources | F435-2 | Host Facilities And/Or Platforms | <p>OUTPUT</p> <p>1) Defended Asset Status</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|--------|-------------------------|--------|----------------------------------|------------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | | | |
| F435-1 | Computational Resources | | | | | | | |
| F435-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Decision aids and procedures
- 2) Friendly force reports
- 3) System status data
- 4) Battle data (S&D and engagement activity reports)
- 5) Previous update of defended asset status

F4351 - MONITOR DEFENDED ASSET STATUS

Description: This function encompasses the processes and means to characterize the current criticality and vulnerability of defended asset, including SDS assets, on the basis of reported status and plans. The function involves monitoring system asset status and activities, monitoring other defended asset status and plans reporting, and characterizing the current criticality and vulnerability of the defended assets based on that data.

| # | <u>Requirement Description</u> |
|---------|----------------------------------|
| F4351-1 | Computational resources |
| F4351-2 | Host facilities and/or platforms |

OUTPUT

- 1) Defended Asset Activity
- 2) Defended Asset Vulnerability

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div><div>1) Decision Aids And Procedures</div><div>2) Defended Asset Vulnerability</div><div>3) Threats Versus Assets/Areas</div><div>4) Object/Event Data (Track File And NUDETs)</div><div>5) Friendly Force Reports</div><div>6) System Status Data</div></div></div> | <div>F4352 - COMPUTE AND INFER DAMAGE EXPECTANCIES</div> <div><div>Description: This function encompasses the processes and means to determine or estimate the survival of defended assets based on their current vulnerabilities, NUDET event data, and continuation or cessation of reporting from assets. The function involves computing damage expectancies from NUDET event data, inferring damage from cessation of reporting, and aggregating the computed and inferred damage estimates to provide best estimates.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F4352-1</div><div>Computational Resources</div></div><div><div>F4352-2</div><div>Host Facilities And/Or Platforms</div></div></div> | <div>OUTPUT</div> <div><div>1) Defended Asset Damage Expectancies</div></div> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|

INPUT

- 1) Decision Aids And Procedures
- 2) Defended Asset Activity
- 3) Defended Asset Vulnerability
- 4) Defended Asset Damage Expectancy

F4353 - UPDATE DEFENDED ASSET DATA

Description: This function encompasses the processes and means to update the real-time databases of defended asset status. The function involves updating asset criticality indices, asset vulnerability parameters, and asset damage expectancy.

| # | <u>Requirement Description</u> |
|---------|----------------------------------|
| F4353-1 | Computational Resources |
| F4353-2 | Host Facilities And/Or Platforms |

OUTPUT

- 1) Current Defended Asset Data
(In A Form Needed By
Supported Functions)

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Current ROEs</div><div>2) Current Defense Preferences</div><div>3) Strategy Selection Overrides</div><div>4) Situation Data</div><div>5) System Status Data</div><div>6) Object/Event Data</div></div> | <div>F44 - SELECT DEFENSIVE RESPONSE</div> <div><div>Description: This high level function encompasses the processes and means for selecting the desired response of the SDS to the existence of threat objects and events relevant to the system. The function includes identifying ROE-imposed constraints on SDS actions, selecting a preferred engagement strategy, selecting preferred engagement tactics, and selecting preferred countermeasure tactics.</div><div><div>#</div><div><u>Requirement Description</u></div></div><div><div>F44-1</div><div>Response Selection Computational Resources</div></div><div><div>F44-2</div><div>Host Facilities And/Or Platforms</div></div><div><div>F44-3</div><div>Communications Or Interfaces With Other Functions Of The Employ SDS Function</div></div></div> | <div>OUTPUT</div> <div><div>1) Engagement Strategy Nominations</div><div>2) Response Parameters</div></div> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|

INPUT

- 1) Current ROEs
- 2) Situation Data
- 3) Object/Event Data
- 4) System Status Data

F441 - IDENTIFY ROE-IMPOSED CONSTRAINTS

Description: This function encompasses the processes and means to determine in real time the constraints on allowable SDS actions which are imposed due to the current set of ROEs and the situation dynamics. The function includes determining satisfaction of ROE conditions (and hence the specific ROE constructs invoked) based on situation and other data, determining which if any of the ROEs are superseded by other invoked ROEs, and determining the union of constraints from the remaining invoked ROEs.

Requirement Description

F441-1 Computational Resources

OUTPUT

- 1) ROE Constraints

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Current ROEs</div><div>2) Situation Data</div><div>3) Object/Event Data</div><div>4) System Status Data</div></div> | <div>F4411 - DETERMINE SATISFACTION OF ROE CONDITIONS</div> <div><div>Description: This function encompasses the processes and means to identify in real time the specific ROEs which are invoked by satisfaction of the conditional part of the ROE construct. The function involves identifying the data needed to determine ROE conditions, extracting the data from system reporting and databases, converting the data as needed for ROE evaluation, determining which ROEs are invoked, and identifying those ROEs.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F4411-1</div><div>Computational Resources</div></div></div> | <div>OUTPUT</div> <div><div>1) ROEs With Satisfied Conditions</div></div> |
|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|

INPUT

- 1) Current ROEs
- 2) ROEs With Satisfied Conditions

F4412 - DETERMINE SUPERSEDED ROES

Description: This function encompasses the processes and means to identify and disinvoke ROEs which are superseded by other invoked ROEs. The function involves identifying invoked ROEs which override other ROEs, identifying which if any of the invoked ROEs are thereby overridden, and disinvoking those

Requirement Description

F4412-1 Computational Resources

OUTPUT

- 1) Remaining Invoked ROEs

| <div>INPUT</div> <div>1) Current ROEs 2) Remaining Invoked ROEs</div> | <div>F4413 - DETERMINE UNION OF ROE CONSTRAINTS</div> <div>Description: This function encompasses the processes and means to identify and disseminate as required the constraints associated with the remaining invoked ROEs. The function involves extracting the constraints from the remaining invoked ROEs, determining the disallowed (or allowed) engagement and countermeasure actions associated with those ROE constraints, and disseminating the ROE-imposed constraints to other SDS functions.</div> <table><thead><tr><th>#</th><th><u>Requirement Description</u></th></tr></thead><tbody><tr><td>F4413-1</td><td>Computational Resources</td></tr></tbody></table> | # | <u>Requirement Description</u> | F4413-1 | Computational Resources | <div>OUTPUT</div> <div>1) ROE Constraints</div> |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|---------|-------------------------|-------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | |
| F4413-1 | Computational Resources | | | | | |

INPUT

- 1) ROE Constraints
- 2) Defense Preferences
- 3) Strategy Overrides
- 4) Situation Data
- 5) Object/Event Data

F442 - SELECT STRATEGY OPTION

Description: This function encompasses the processes and means to select, nominate, and specify a preferred, allowable engagement strategy in accordance with defense preferences and situation and other data, as well as to implement a strategy override from the positive control function of the SDS. The select strategy function includes determining allowable strategy options in relation to ROE constraints, computing strategy selection metrics, nominating a preferred strategy option, implementing strategy selection overrides as required, and specifying the governing strategy.

Requirement Description

F442-1 Strategy Selection Resources (Computational Resources And/Or Personnel)

F442-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Engagement Strategy Nomination
- 2) Strategy Selection (And Specification)

| <p>INPUT</p> <p>1) ROE Constraints</p> | <p>F4421 - DETERMINE ALLOWABLE STRATEGY OPTIONS</p> <p>Description: This function encompasses the processes and means to identify which of the potential strategy options are allowable under the current ROE-imposed constraints. The function involves identifying actions involved in each strategy option, comparing those actions against ROE-imposed constraints to determine precluded strategy options, and identifying remaining allowed strategy options.</p> <table> <tr> <th>#</th><th>Requirement</th><th>Description</th></tr> <tr> <td>F4421-1</td><td>Strategy Selection</td><td>Resources</td></tr> <tr> <td>F4421-2</td><td>Host Facilities And/Or</td><td>Platforms</td></tr> </table> | # | Requirement | Description | F4421-1 | Strategy Selection | Resources | F4421-2 | Host Facilities And/Or | Platforms | <p>OUTPUT</p> <p>1) Set Of Allowed Strategy Options</p> |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|---------|--------------------|-----------|---------|------------------------|-----------|----------------------------------------------------------------|
| # | Requirement | Description | | | | | | | | | |
| F4421-1 | Strategy Selection | Resources | | | | | | | | | |
| F4421-2 | Host Facilities And/Or | Platforms | | | | | | | | | |

INPUT

- 1) Defense Preferences
- 2) Set Of Allowed Strategy Options
- 3) Situation Data
- 4) Object/Event Data
- 5) Previous Strategy Selection (If Applicable)

F4422 - COMPUTE STRATEGY SELECTION METRICS

Description: This function encompasses the processes and means to assess goodness metrics for allowed strategy options in relation to defense preferences, situation and other data, and the previous strategy selection (if applicable). The function involves determining the particular method(s) to assess goodness metrics, determining data needed to assess the metrics, extracting required data from system reporting and databases, converting the data as needed to calculate goodness metrics, and actual calculating of the metrics for the set of allowed strategy options.

Requirement Description

F4422-1 Strategy Selection Resources

F4422-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Assessed Goodness Metrics For Allowed Strategy Options

| <div>INPUT</div> <div>1) Set Of Allowed Strategy Options 2) Assessed Goodness Metrics</div> | <div>F4423 - NOMINATE PREFERRED STRATEGY OPTION</div> <div>Description: This function encompasses the processes and means to identify and nominate a preferred, allowable strategy option based on the assessed goodness metrics. The function involves rank ordering of allowed strategy options in accordance with each of the (possibly many) goodness metrics, identifying and eliminating dominated strategy options (i.e., those which rank lower than at least one other strategy option with respect to all the metrics), weighting the relative importance of the selection metrics, and identifying and nominating the strategy option which is preferred relative to the complete set of weighted metrics.</div> <table><thead><tr><th>#</th><th><u>Requirement Description</u></th></tr></thead><tbody><tr><td>F4423-1</td><td>Strategy Selection Resources</td></tr><tr><td>F4423-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table> | # | <u>Requirement Description</u> | F4423-1 | Strategy Selection Resources | F4423-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div>1) Engagement Strategy Nomination</div> |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|---------|------------------------------|---------|----------------------------------|----------------------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | | | |
| F4423-1 | Strategy Selection Resources | | | | | | | |
| F4423-2 | Host Facilities And/Or Platforms | | | | | | | |

| <div>INPUT</div> <div>1) Strategy Override Message 2) Engagement Strategy Nomination</div> | <div>F4424- IMPLEMENT STRATEGY SELECTION OVERRIDE (AS REQUIRED)</div> <div>Description: This function encompasses the processes and means to implement strategy selection overrides whenever they are commanded from the positive control function of the SDS. The function involves monitoring and receiving a strategy selection override message from the positive control cell, authenticating the override command, and providing the associated alternative strategy for specification in lieu of the nominated strategy.</div> <div><table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F4424-1</td><td>Strategy Selection Resources</td></tr><tr><td>F4424-2</td><td>Host Facilities And/Or Platforms</td></tr></table></div> | # | <u>Requirement Description</u> | F4424-1 | Strategy Selection Resources | F4424-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div>1) Alternative Strategy For Specification</div> |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|---------|------------------------------|---------|----------------------------------|------------------------------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | | | |
| F4424-1 | Strategy Selection Resources | | | | | | | |
| F4424-2 | Host Facilities And/Or Platforms | | | | | | | |

| <p style="text-align: center;">INPUT</p> <p>1) Nominated Or Alternative (Override) Strategy Selection 2) Defense Preferences 3) Situation Data 4) Object/Event Data</p> | <p style="text-align: center;">F4425 - SPECIFY GOVERNING STRATEGY</p> <p>Description: This function encompasses the processes and means to specify the governing strategy (i.e., the nominated strategy or the alternative strategy associated with a strategy selection override, as applicable) in terms of response parameters needed as inputs by other SDS functions. The function involves specifying the strategy option identification, the associated target/threat value computation method, the weapons withhold requirements, and other strategy specific constraints as applicable.</p> <table> <thead> <tr> <th>#</th><th>Requirement Description</th></tr> </thead> <tbody> <tr> <td>F4425-1</td><td>Strategy Selection Resources</td></tr> <tr> <td>F4425-2</td><td>Host Facilities And/Or Platforms</td></tr> </tbody> </table> | # | Requirement Description | F4425-1 | Strategy Selection Resources | F4425-2 | Host Facilities And/Or Platforms |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|------------------------------|---------|----------------------------------|
| # | Requirement Description | | | | | | |
| F4425-1 | Strategy Selection Resources | | | | | | |
| F4425-2 | Host Facilities And/Or Platforms | | | | | | |
| | <p style="text-align: center;">OUTPUT</p> <p>1) Specified Engagement Strategy Selection</p> | | | | | | |

INPUT

- 1) Roe Constraints
- 2) Engagement Strategy Selection
- 3) Defense Preferences
- 4) System Status Data
- 5) Situation Data
- 6) Object/Event Data

F443 - SELECT ENGAGEMENT TACTICS

Description: This function encompasses the processes and means to select and specify preferred, allowed engagement tactics in relation to ROE constraints, the engagement strategy selection, defense preferences, and situation and other data. The function includes determining allowed engagement actions, determining compatible engagement action sets, computing engagement tactics selection metrics, and selecting and specifying governing engagement tactics.

| # | <u>Requirement Description</u> |
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| | |
|--------|-------------------------|
| F443-1 | Computational Resources |
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| | |
|--------|----------------------------------|
| F443-2 | Host Facilities And/Or Platforms |
|--------|----------------------------------|

OUTPUT

- 1) Engagement Tactics Selection (And Specification)

| <div>INPUT</div> <div> 1) ROE Constraints 2) Selected Engagement Strategy </div> | <div> F4431 - DETERMINE ALLOWABLE ENGAGEMENT ACTIONS </div> <div> Description: This function encompasses the processes and means to identify the potential engagement actions which are allowed by the ROE-imposed constraints and the strategy selection. The function involves comparing engagement actions against ROE constraints, comparing engagement actions against the specified engagement strategy, determining precluded actions, and identifying remaining allowed engagement actions. </div> <div> <table> <tr> <th>#</th> <th>Requirement Description</th> </tr> <tr> <td>F4431-1</td> <td>Computational Resources</td> </tr> <tr> <td>F4431-2</td> <td>Host Facilities And/Or Platforms</td> </tr> </table> </div> | # | Requirement Description | F4431-1 | Computational Resources | F4431-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div> 1) Allowed Engagement Actions </div> |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|--------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4431-1 | Computational Resources | | | | | | | |
| F4431-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Allowed Engagement Actions
- 2) System Status Data

F4432 - DETERMINE COMPATIBLE ENGAGEMENT ACTION SETS

Description: This function encompasses the processes and means to identify and sequence compatible sets of allowed engagement actions. The function involves determining mutually exclusive and mutually compatible engagement actions, formulating sets of mutually compatible engagement actions, and sequencing the actions in each compatible set.

| # | <u>Requirement Description</u> |
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| F4432-1 | Computational Resources |
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| | |
|---------|----------------------------------|
| F4432-2 | Host Facilities And/Or Platforms |
|---------|----------------------------------|

OUTPUT

- 1) Logically Compatible, Sequenced Sets Of Allowable Engagement Actions

| <div>INPUT</div> <div><div>1) Compatible Sets Of Allowed Engagement Actions</div><div>2) Defense Preferences</div><div>3) System Status Data</div><div>4) Situation Data</div><div>5) Object/Event Data</div><div>6) Previously Selected Engagement Tactics</div></div> | <div>F4433 - COMPUTE ENGAGEMENT TACTICS SELECTION METRICS</div> <div><div>Description: This function encompasses the processes and means to assess goodness metrics for the compatible sets of allowed engagement actions in relation to defense preferences, situation and other data, and previously selected engagement tactics. The function involves determining the method(s) to assess goodness of action sets, determining the data needed to assess the goodness metrics, extracting the required data from system reporting and databases, converting the data as needed to calculate the metrics, and actual calculating of the goodness metrics.</div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4433-1</td><td>Computational Resources</td></tr><tr><td>F4433-2</td><td>Host Facilities And/Or Platforms</td></tr></table></div> | # | Requirement Description | F4433-1 | Computational Resources | F4433-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div><div>1) Assessed Goodness Metrics For Compatible Sets Of Allowed Engagement Actions</div></div> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|------------------------------------------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4433-1 | Computational Resources | | | | | | | |
| F4433-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Compatible Sets Of Allowed Engagement Actions
- 2) Defense Preferences
- 3) Assessed Goodness Metrics
- 4) Situation Data
- 5) Object/Event Data
- 6) System Status Data

F4434 - SELECT/SPECIFY GOVERNING ENGAGEMENT TACTICS

Description: This function encompasses the processes and means to select and specify the governing engagement tactics based on the assessed goodness metrics and data needed to specify the tactics. The function involves rank ordering of the compatible engagement action sets in accordance with each of the goodness metrics, eliminating dominated action sets, weighting the relative importance of the selection metrics based on defense preferences and other data, selecting engagement action set(s) which is (are) preferred based on all the weighted goodness metrics, and specifying the selected engagement action set(s). The specification includes the specific engagement actions and sequence(s), battle space partitioning criteria, platform preference parameters, weapons commit thresholds, required confidence of kill, and other engagement tactics parameters as applicable.

Requirement Description

F4434-1 Computational Resources

F4434-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Engagement Tactics Selection (And Specification)

| <div>INPUT</div> <div><div>1) ROE Constraints</div><div>2) Selected Engagement Strategy</div><div>3) Defense Preferences</div><div>4) Selected Engagement Tactics</div><div>5) System Status Data</div><div>6) Situation Data</div><div>7) Object/Event Data</div></div> | <div>F444 - SELECT COUNTERMEASURES TACTICS</div> <div><div>Description: This function encompasses the processes and means to select and specify allowable countermeasures tactics in accordance with ROE-imposed constraints, the selected engagement strategy, defense preferences, the selected engagement tactics, and situation and other data. The function includes determining allowable countermeasure actions, determining compatible countermeasure action sets, computing countermeasure tactics selection metrics, and selecting and specifying the governing countermeasure tactics.</div><table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F444-1</td><td>Computational Resources</td></tr><tr><td>F444-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table></div> | # | Requirement Description | F444-1 | Computational Resources | F444-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div><div>1) Countermeasure Tactics Selection (And Specification)</div></div> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|--------|-------------------------|--------|----------------------------------|-------------------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F444-1 | Computational Resources | | | | | | | |
| F444-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) ROE Constraints
- 2) Selected Engagement Strategy
- 3) Selected Engagement Tactics

F4441 - DETERMINE ALLOWABLE COUNTER-MEASURE ACTIONS

Description: This function encompasses the processes and means to identify the potential countermeasure (CM) actions which are allowed under the current ROE-imposed constraints and the selected engagement strategy and which are compatible with the selected engagement tactics. The function involves comparing potential CM actions against ROE constraints, the specified strategy, and the specified engagement tactics to determine precluded CM actions and to identify remaining allowed CM actions.

| # | <u>Requirement Description</u> |
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| F4441-1 | Computational Resources |
|---------|-------------------------|

| | |
|---------|----------------------------------|
| F4441-2 | Host Facilities And/Or Platforms |
|---------|----------------------------------|

OUTPUT

- 1) Allowable Countermeasure Actions

| <div>INPUT</div> <div>1) Allowable Countermeasure Actions 2) System Status Data</div> | <div>F4442 - DETERMINE COMPATIBLE COUNTER-MEASURE ACTION SETS</div> <div>Description: This function encompasses the processes and means to identify and sequence compatible sets of allowed CM actions. The function involves determining mutually exclusive and mutually compatible CM actions, formulating sets of mutually compatible CM actions, and sequencing the actions in each set.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4442-1</td><td>Computational Resources</td></tr><tr><td>F4442-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table> | # | Requirement Description | F4442-1 | Computational Resources | F4442-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div>1) Logically Compatible And Sequenced Sets Of Allowable Countermeasure Actions</div> |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|-------------------------------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4442-1 | Computational Resources | | | | | | | |
| F4442-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Compatible Sets Of Allowed Countermeasure Actions
- 2) Defense Preferences
- 3) Selected Engagement Tactics
- 4) System Status Data
- 5) Situation Data
- 6) Object/Event Data
- 7) Previously Selected Countermeasure Tactics

F4443 - COMPUTE COUNTERMEASURE TACTICS SELECTION METRICS

Description: This function encompasses the processes and means to assess goodness metrics for compatible sets of allowed CM actions in relation to defense preferences, situation and other data, and previously selected countermeasure tactics as applicable. The function involves determining the method(s) to assess goodness of CM action sets, determining the associated data needed to assess the goodness metrics, extracting the data from system reporting and databases, converting the data as needed to calculate the metrics, and actual calculating of the goodness metrics for the compatible CM action sets.

Requirement Description

F4443-1 Computational Resources

F4443-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Assessed Goodness Metrics For Compatible Countermeasure Action Sets

| INPUT | F4444 - SELECT/SPECIFY GOVERNING COUNTERMEASURE TACTICS | OUTPUT | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------|---------|-------------------------|---------|----------------------------------|--------------------------------------------------------------------|
| <div>1) Compatible Sets Of Allowed Countermeasure Actions</div> <div>2) Defense Preferences</div> <div>3) Assessed Goodness Metrics For Sets Of Countermeasure Actions</div> <div>4) Selected Engagement Tactics</div> <div>5) System Status Data</div> <div>6) Situation Data</div> <div>7) Object/Event Data</div> | <div>Description: This function encompasses the processes and means to select and specify the countermeasure tactics in relation to the assessed goodness metrics, defense preferences, and situation and other data. The function involves rank ordering the sets of compatible CM actions in accordance with each goodness metric, eliminating dominated CM action sets, weighting the relative importance of the goodness metrics, selecting a preferred CM action set(s) with respect to all the goodness metrics, and specifying the selected countermeasure tactics. The specification includes the specific CM actions and sequence(s), survival goals by system function, asset/platform level survival goals, thresholds for use of expendable CM resources, engagement-versus-CM deconfliction criteria, and other countermeasure tactics parameters as applicable.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4444-1</td><td>Computational Resources</td></tr><tr><td>F4444-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table> | # | Requirement Description | F4444-1 | Computational Resources | F4444-2 | Host Facilities And/Or Platforms | <div>1) Countermeasure Tactics Selection (And Specification)</div> |
| # | Requirement Description | | | | | | | |
| F4444-1 | Computational Resources | | | | | | | |
| F4444-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Defensive Response Selection Parameters
- 2) System Mode Selection
- 3) Situation Data
- 4) System Status Data
- 5) Object/Event Data (Track File)
- 6) Threat Objects

F45 - EXECUTE DEFENSIVE RESPONSE

Description: This high level function encompasses the processes and means to execute the preferred defensive response as allowed by the system mode selection in effect. The function includes assignment of values to targets/threats, allocation of targets/threats for engagement, assignment of system resources for engagement, actual engagement of targets/threats as authorized, and employment of countermeasures as authorized.

Requirement Description

- | | |
|-------|-------------------------------------------|
| F45-1 | Battle Management Computational Resources |
| F45-2 | Engagement Weapons And Fire Control |
| F45-3 | Countermeasures Capabilities |

OUTPUT

- 1) Engagement Activity Reports
- 2) Kill Assessment Observables Collection Requests
- 3) Destroyed And Residual Threats
- 4) Engagement Losses And Expenditures

| <div>INPUT</div> <div>1) Target Value Computation Method (Part Of Response Parameters) 2) Situation Data 3) Track File</div> | <div>F451 - ASSIGN VALUES TO TARGETS/THREATS</div> <div>Description: This function encompasses the processes and means to assign engagement value scores to target or threat objects in support of engagement allocation. The function includes obtaining or inferring threat value parameters, computing current threat value, and extrapolating the value into the future.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F451-1</td><td>Computational Resources</td></tr><tr><td>F451-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table> | # | Requirement Description | F451-1 | Computational Resources | F451-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div>1) Target/Threat Values (Over Time)</div> |
|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|--------|-------------------------|--------|----------------------------------|------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F451-1 | Computational Resources | | | | | | | |
| F451-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Target value computation method
- 2) Situation data
- 3) Track file

F4511 - OBTAIN OR INFER TARGET/THREAT VALUE PARAMETERS

Description: This function encompasses the processes and means to obtain or infer the parameters needed to compute target/threat value. The function involves identifying the data needed to compute target/threat value in accordance with the selected target value computation method, extracting available data from system reporting and databases, identifying missing data, and determining and executing the method(s) to estimate or infer the missing data.

Requirement Description

F4511-1 Computational resources

F4511-2 Host facilities and/or platforms

OUTPUT

- 1) Value parameters for computation of target/threat value

| <div>INPUT</div> <div>1) Target Value Computation Method 2) Value Parameters</div> | <div>F4512 - COMPUTE CURRENT TARGET/THREAT VALUE</div> <div>Description: This function encompasses the processes and means to compute the current target/threat value in accordance with the selected method and the value parameters. The function involves, as applicable to the selected method, computing the land area/asset at risk component, the destructive power/asset kill probability component, the current accumulated probability of kill for the object due to weapons already committed against it, the remaining engagement time component, any special engagement strategy or tactics components, and the aggregation of the value computation components.</div> <div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4512-1</td><td>Computational Resources</td></tr><tr><td>F4512-2</td><td>Host Facilities And/Or Platforms</td></tr></table></div> | # | Requirement Description | F4512-1 | Computational Resources | F4512-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div>1) Current Target/Threat Value</div> |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|-------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4512-1 | Computational Resources | | | | | | | |
| F4512-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Target Value Computation Method
- 2) Value Parameters
- 3) Current Target/Threat Value
- 4) Track File

F4513 - EXTRAPOLATE TARGET/THREAT VALUES INTO FUTURE

Description: This function encompasses the processes and means to extrapolate target/threat values into the future in accordance with the selected target value computation method and the value parameters. Depending on the selected value computation method, the function involves estimating future times of object type and status changes, estimating future last engagement opportunity times, and computing the aggregate threat value extrapolation.

| # | <u>Requirement Description</u> |
|---------|----------------------------------|
| F4513-1 | Computational Resources |
| F4513-2 | Host Facilities And/Or Platforms |

OUTPUT

- 1) Target/Threat Values (Over Time)

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Strategy And Tactics Selections</div><div>2) Target/Threat Values</div><div>3) Platform Preference Parameters</div><div>4) Weapon Commit Thresholds</div><div>5) System Status Data</div></div> | <div>F452 - ALLOCATE TARGETS/THREATS FOR ENGAGEMENT</div> <div><div>Description: This function encompasses the processes and means to allocate targets/threats for engagement by the SDS based on parameters from the defensive response selection. The function includes partitioning the battle space, identifying feasible weapon/target pairings, computing the weapon/target payoffs and where they are optimized in time, and selecting a preferred allocation with associated objective firing times.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F452-1</div><div>Computational Resources</div></div><div><div>F452-2</div><div>Host Facilities And/Or Platforms</div></div></div> | <div>OUTPUT</div> <div><div>1) Target/Threat Allocation</div></div> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|

INPUT

- 1) Strategy And Tactics Selection
- 2) System Status Data
- 3) Track File

F4521 - PARTITION BATTLE SPACE IAW ENGAGEMENT STRATEGY/TACTICS

Description: This function encompasses the processes and means to partition the battle space in order to avoid span of control problems and to reduce and level the data distribution and processing loads associated with battle management. The function includes identifying the relevant type of battle space partitioning, identifying the preferred size and scope of the partitions, mapping the targets/threats into the partitions, and mapping the SDS engagement and engagement support resources into the partitions.

| # | Requirement Description |
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| | |
|---------|-------------------------|
| F4521-1 | Computational Resources |
|---------|-------------------------|

| | |
|---------|----------------------------------|
| F4521-2 | Host Facilities And/Or Platforms |
|---------|----------------------------------|

OUTPUT

- 1) Battle Space Partitions

| <div>INPUT</div> <div><div>1) Battle Space Partitions</div><div>2) System Status Data</div><div>3) Track File</div></div> | <div>F4522 - IDENTIFY FEASIBLE WEAPON ASSET/ TARGET PAIRINGS AND TIMES</div> <div><div>Description: This function encompasses the processes and means to identify feasible weapon/target pairings and times within the battle space partitions based on the trajectories of the targets/threats, the positions and motions of weapon platforms, and the weapon engagement envelopes. The function involves determining the appropriate extrapolation methods, extrapolating the threat object and weapon platform positions and the weapon envelopes into the future, and estimating the engagement opportunity windows, as defined by the earliest and latest engagement times.</div><div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F4522-1</td><td>Computational Resources</td></tr><tr><td>F4522-2</td><td>Host Facilities And/Or Platforms</td></tr></table></div></div> | # | Requirement Description | F4522-1 | Computational Resources | F4522-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div><div>1) Feasible Weapon Asset/Target Pairings Over Time</div></div> |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|--------------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4522-1 | Computational Resources | | | | | | | |
| F4522-2 | Host Facilities And/Or Platforms | | | | | | | |

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div><div>1) Target/Threat Values</div><div>2) Platform Preference Parameters</div><div>3) Feasible Weapon Asset/Target Pairing Over Time</div><div>4) Track File</div><div>5) System Status Data</div><div>6) Situation Data</div><div>7) Last Target/Threat Allocation</div></div></div> | <div>F4523 - ASSESS PAYOFF OF FEASIBLE PAIRINGS AND TIMES</div> <div><div>Description: This function encompasses the processes and means to estimate the engagement payoffs over time for each of the feasible weapon asset/target pairings. The function involves receiving the time-dependent target/threat values, estimating the single-shot probabilities of kill over time, estimating the platform preferences over time, computing aggregate expected payoffs over time, determining the times when the weapon/target pairing payoffs are maximized, and determining the sensitivities of the optimum firing times, as applicable to the particular engagement phase allocation algorithms.</div><div><div><div>#</div><div>Requirement Description</div></div><div><div>F4523-1</div><div>Computational Resources</div></div><div><div>F4523-2</div><div>Host Facilities And/Or Platforms</div></div></div></div> | <div>OUTPUT</div> <div><div>1) Weapon/Target Pairing Payoffs Over Time</div></div> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|

| <p>INPUT</p> <p>1) Strategy And Tactics Selection 2) Weapon Commit Thresholds 3) Weapon/Target Pairing Payoffs Over Time</p> | <p>F4524 - SELECT PREFERRED ALLOCATION AND FIRING TIMES</p> <p>Description: This function encompasses the processes and means to select a set of preferred target/threat allocations and engagement times based on the selected engagement strategy/tactics, weapon/target pairing payoffs, and weapon commit thresholds. The function involves determining the time budget for solving the allocation problem, identifying primary and fallback allocation algorithms, loading and executing the allocation algorithms, determining satisfactory algorithm completion at the end of the time budget, identifying the allocation from the primary or backup algorithm (depending upon satisfactory completion), and appending associated payoff and objective firing time data to the allocation for use in assigning weapons firing sequences.</p> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4524-1</td><td>Computational Resources</td></tr><tr><td>F4524-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table> | # | Requirement Description | F4524-1 | Computational Resources | F4524-2 | Host Facilities And/Or Platforms | <p>OUTPUT</p> <p>1) Target/Threat Allocation</p> |
|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|--------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4524-1 | Computational Resources | | | | | | | |
| F4524-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Target/Threat Allocation
- 2) Specified Engagement Actions
- 3) System Status Data
- 4) Track File

F453 - ASSIGN RESOURCES FOR ENGAGEMENT

Description: This function encompasses the processes and means to assign and task SDS resources in order to engage the allocated targets and threats. This function includes assigning weapon firing sequences, assigning fire control requirements, requesting or assigning target designation requirements, and requesting kill assessment observables collection. The resources are tasked based on their availability and constraints, the selected engagement tactics, and the preferred set of target/threat allocations.

Requirement Description

F453-1 Computational Resources

F453-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Engagement Asset Taskings
- 2) Kill Assessment Collection Requests

| | | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|--------------------------------------------------------|
| <div>INPUT</div> <div>1) Target/Threat Allocation 2) Specified Engagement Actions 3) System Status Data 4) Track File</div> | <div>F4531 - ASSIGN WEAPON FIRING SEQUENCE</div> <div>Description: This function encompasses the processes and means to assign and task the weapon firing sequence for weapon platforms/sites. The function involves receiving the target/threat allocation and associated data, determining the weapon platform/site firing rate constraints, determining a firing sequence to optimize the net defense payoff, assigning specific weapons for the selected sequence, and tasking the weapon assets.</div> <table><tr><td>#</td><td>Requirement Description</td></tr><tr><td>F4531-1</td><td>Computational Resources</td></tr><tr><td>F4531-2</td><td>Host Facilities And/Or Platforms</td></tr></table> | # | Requirement Description | F4531-1 | Computational Resources | F4531-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div>1) Weapon Firing Taskings</div> |
| # | Requirement Description | | | | | | | |
| F4531-1 | Computational Resources | | | | | | | |
| F4531-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Specified Engagement Actions
- 2) Weapon Firing Taskings
- 3) System Status Data
- 4) Track File

F4532 - ASSIGN FIRE CONTROL REQUIREMENTS

Description: This function encompasses the processes and means to assign fire control requirements based on the specified engagement actions and weapon firing sequence taskings (and the particular weapon fire control requirements). This function involves monitoring specific weapon firing taskings, determining fire control requirements in accordance with the selected engagement tactics, determining available fire control assets, and assigning and tasking the fire control assets.

Requirement Description

F4532-1 Computational Resources

F4532-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Fire Control Taskings

| <div>INPUT</div> <div><div>1) Specified Engagement Actions</div><div>2) Weapon Firing Taskings</div><div>3) Track File</div><div>4) System Status Data</div></div> | <div>F4533 - REQUEST/ASSIGN TARGET DESIGNATION REQUIREMENTS</div> <div><div>Description: This function encompasses the processes and means to request or assign target designation requirements based on the weapon firing sequence taskings and the specified engagements actions. This function involves monitoring the specific weapon firing taskings, determining target designation requirements in accordance with the selected engagement tactics, determining available target designation assets, requesting or assigning the target designation responsibilities, and ultimately tasking target designation assets.</div><table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4533-1</td><td>Computational Resources</td></tr><tr><td>F4533-2</td><td>Host Facilities And/Or Platforms</td></tr></tbody></table></div> | # | Requirement Description | F4533-1 | Computational Resources | F4533-2 | Host Facilities And/Or Platforms | <div>OUTPUT</div> <div><div>1) Target Designation Taskings</div></div> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|-------------------------|---------|----------------------------------|------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F4533-1 | Computational Resources | | | | | | | |
| F4533-2 | Host Facilities And/Or Platforms | | | | | | | |

INPUT

- 1) Specified Engagement Actions
- 2) Weapon Firing Taskings
- 3) Track File
- 4) System Status Data

F4534 - REQUEST KILL ASSESSMENT OBSERVABLES COLLECTION

Description: This function encompasses the processes and means to request kill assessment observables collection based on the specific weapon firing sequence taskings and the specified engagement actions. The function involves monitoring the weapon firing taskings, determining kill assessment observables collection requirements in accordance with the selected engagement tactics, and requesting S&D kill assessment observables collection.

| # | Requirement Description |
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|---|-------------------------|

| | |
|---------|-------------------------|
| F4534-1 | Computational Resources |
|---------|-------------------------|

| | |
|---------|----------------------------------|
| F4534-2 | Host Facilities And/Or Platforms |
|---------|----------------------------------|

OUTPUT

- 1) Kill Assessment Collection Requests

INPUT

- 1) Alert Level
- 2) Weapon Firing Taskings
- 3) Engagement Enablement
- 4) Fire Control Tasking
- 5) Target Designation Tasking
- 6) Track Files
- 7) Threat Object

F454 - ENGAGE TARGETS/THREATS

Description: This function encompasses the processes and means to engage the threats and targets based on the weapon firing taskings and in accordance with the alert levels and engagement enablements. This function includes preparing and orienting the weapon, firing the weapon, providing needed guidance or aiming corrections, designating the target, and completing the target intercept. This function requires specific release authority from the positive control cell in order to engage the targets and threats.

| # | Requirement Description |
|--------|----------------------------------|
| F454-1 | Message Authentication Means |
| F454-2 | Weapon Subsystem |
| F454-3 | Fire Control Subsystem |
| F454-4 | Host Facilities And/Or Platforms |

OUTPUT

- 1) Weapon And Fire Control Activities Reports
- 2) Destroyed Or Residual Threat
- 3) Weapon Expenditure

INPUT

- 1) Alert Level
- 2) Weapon Firing Tasking
- 3) Track File

F4541 - PREPARE AND ORIENT WEAPON

Description: This function encompasses the processes and means to complete preparation of weapons platforms/sites and weapons for firing, based on the SDS alert level and weapon firing taskings. The function involves authenticating the alert level and firing tasking commands, computing required weapon orientation, and, if authorized, loading data into the weapon, loading weapon energy production components (e.g., for directed energy weapons), loading other weapon components as needed (e.g., cryogenics for infrared seekers), and completing weapon preparation and orientation (e.g., disconnect cables and hoses on interceptors).

| # | Requirement Description |
|---------|------------------------------|
| F4541-1 | Message Authentication Means |
| F4541-2 | Weapon Subsystem |
| F4541-3 | Host Platform Or Site |

OUTPUT

- 1) Prepared Weapon

| <p>INPUT</p> <p>1) Engagement Enablement 2) Weapon Firing Taskings 3) Prepared Weapons</p> | <p>F4542 - FIRE WEAPON</p> <p>Description: This function encompasses the processes and means to fire an SDS weapon. The function involves authenticating weapon firing enablement, starting the energy or mass delivery component if authorized, and controlling the output of that component. The function requires release authority from the positive control cell.</p> <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F4542-1</td><td>Message Authentication Means</td></tr><tr><td>F4542-2</td><td>Weapon Subsystem</td></tr></table> | # | <u>Requirement Description</u> | F4542-1 | Message Authentication Means | F4542-2 | Weapon Subsystem | <p>OUTPUT</p> <p>1) Fired Weapon 2) Weapon Expenditure</p> |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|---------|------------------------------|---------|------------------|-----------------------------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | | | |
| F4542-1 | Message Authentication Means | | | | | | | |
| F4542-2 | Weapon Subsystem | | | | | | | |

INPUT

- 1) Engagement Enablement
- 2) Fire Control Tasking
- 3) Fired Weapon
- 4) Track Files

F4543 - PROVIDE NEEDED GUIDANCE OR AIMING CORRECTIONS

Description: This function encompasses the processes and means to provide the weapon with needed guidance or aiming corrections based on the fire control taskings, engagement enablement, and track file data. This requires an extrapolation of the target state vector (from the track file or fire control subsystem) and the weapon state vector (from the track file, the weapon's own navigation means, or a separate fire control subsystem) in order to predict a new intercept point. This function may also include providing the weapon with antenna steering commands to control the weapon from the primary or secondary platforms. In general, the function requires authentication of guidance/aiming enablement before updates are allowed to be provided to the weapon. The weapon must also be able to execute the guidance or aiming correction.

| # | Requirement Description |
|---------|------------------------------|
| F4543-1 | Message Authentication Means |
| F4543-2 | Fire Control Subsystem |
| F4543-3 | Weapon Subsystem |

OUTPUT

- 1) Corrected Weapons

| <div>INPUT</div> <div><div>1) Engagement Enablement</div><div>2) Target Designation Tasking</div><div>3) Corrected Weapon</div><div>4) Track Files</div><div>5) Threat Object</div></div> | <div>F4544 - DESIGNATE TARGET FOR INTERCEPT</div> <div><div>Description: This function encompasses the processes and means to provide the weapon with a designation of the target before the lethal energy delivery time is reached in order for the weapon to complete its intercept. The function involves authenticating target designation enablement, extrapolating positions of the target and other objects, optionally associating signature data with the target and other objects, and execution of the designation if authorized. Target designation may be by a target object map or similar means, by semi-active designation, or by fully active designation.</div><table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4544-1</td><td>Message Authentication Means</td></tr><tr><td>F4544-2</td><td>Fire Control/Target Designation Subsystem</td></tr><tr><td>F4544-3</td><td>Weapon Subsystem</td></tr></tbody></table></div> | # | Requirement Description | F4544-1 | Message Authentication Means | F4544-2 | Fire Control/Target Designation Subsystem | F4544-3 | Weapon Subsystem | <div>OUTPUT</div> <div><div>1) Designated Target</div></div> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|------------------------------|---------|-------------------------------------------|---------|------------------|--------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | |
| F4544-1 | Message Authentication Means | | | | | | | | | |
| F4544-2 | Fire Control/Target Designation Subsystem | | | | | | | | | |
| F4544-3 | Weapon Subsystem | | | | | | | | | |

INPUT

- 1) Designated Target
- 2) Corrected Weapons
- 3) Threat Object

F4545 - COMPLETE THE INTERCEPT

Description: This function encompasses the processes and means to complete the weapon intercept in order to destroy or negate the target. This function involves acquiring and identifying the target with a weapon sensor(s), determining relative positions and velocities, computing final corrections for intercept, executing final maneuvers or aiming corrections, and delivering lethal energy to the target. It can also include employing lethality enhancers as in the case of a kinetic energy weapon.

| # | Requirement Description |
|---------|-------------------------|
| F4545-1 | Weapon Sensor Subsystem |
| F4545-2 | Weapon Subsystem |

OUTPUT

- 1) Destroyed Or Residual Threat

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Specified countermeasure actions</div><div>2) Alert level</div><div>3) Countermeasure enablements</div><div>4) Engagement asset taskings</div><div>5) Track file</div><div>6) Residual threats</div></div> | <div>F455 - EMPLOY COUNTERMEASURES</div> <div><div>Description: This function encompasses the processes and means to assign and employ the countermeasure resources in order to mitigate attempted suppression of the SDS. The function includes resolving conflicts between engagement and countermeasure actions, assigning a preferred countermeasure action sequence, and employing the selected countermeasures. In general, the employment of countermeasures requires enablement from the positive control cell order to minimize the possibility of actions being perceived as provocations, to conserve SDS asset life or capabilities, and/or to prevent disclosure of classified capabilities.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F455-1</div><div>Message authentication means</div></div><div><div>F455-2</div><div>Computational resources</div></div><div><div>F455-3</div><div>Countermeasure capabilities and resources</div></div></div> | <div>OUTPUT</div> <div><div>1) Countermeasure activity reports</div><div>2) Countermeasure actions</div><div>3) Countermeasure expenditures</div><div>4) Battle losses</div></div> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

INPUT

- 1) Specified Countermeasure Actions
- 2) Engagement Asset Taskings

F4551 - DECONFLICT ENGAGEMENT AND COUNTERMEASURE ACTIONS

Description: This function encompasses the processes and means to resolve conflicts among the assigning and tasking of resources for engagement and countermeasure actions. The function includes receiving specified countermeasure actions, monitoring engagement asset taskings, identifying countermeasure actions in conflict with engagement taskings, and identifying nonconflicting time windows for employing countermeasure actions. This requires the function to determine the implications of executing a countermeasure action on assigned or tasked engagement actions, such as the effect of executing an avoidance maneuver at a weapon platform on the ability to fire the weapon, to continue to provide guidance or aiming corrections, or to provide target designation.

Requirement Description

F4551-1 Computational Resources

F4551-2 Host Facilities And/Or Platforms

OUTPUT

- 1) Countermeasure Time Windows And Constraints

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Specified Countermeasure Actions</div><div>2) Countermeasure Time Windows And Constraints</div><div>3) Track File</div></div> | <div>F4552 - ASSIGN COUNTERMEASURE ACTION SEQUENCE</div> <div>Description: This function encompasses the processes and means to select a preferred countermeasure sequence for the specified countermeasure actions which conforms to the available time windows and constraints. This function involves determining feasible bounds for employing the countermeasures, selecting a feasible and preferred countermeasure sequence and timing, and assigning actions and timing to countermeasure resources. It also involves reporting the assigned countermeasure action sequences as situation information for other SDS functions.</div> <div><div><div>#</div><div>Requirement Description</div></div><div><div>F4552-1</div><div>Computational Resources</div></div><div><div>F4552-2</div><div>Host Facilities And/Or Platforms</div></div></div> | <div>OUTPUT</div> <div><div>1) Preferred Countermeasure Action Sequence</div></div> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|

INPUT

- 1) Alert Level
- 2) Countermeasure Enablement
- 3) Preferred Countermeasure Action Sequence
- 4) Residual Threats

F4553 - EMPLOY SELECTED COUNTERMEASURES

Description: This function encompasses the processes and means to employ the selected countermeasures in accordance with the preferred countermeasure action sequence and countermeasures enablement commands. This function involves authenticating the countermeasure enablement, activating the countermeasure resources at the assigned times, controlling or adjusting the countermeasure execution, and ceasing execution of the countermeasures as assigned or as directed (e.g., by a disablement command). Potential countermeasures include, but are not limited to, electronic countermeasures (ECM), decoys and deception, and avoidance maneuvers.

Requirement Description

F4553-1 Message Authentication Means

F4553-2 Countermeasure Capabilities And Resources

OUTPUT

- 1) Countermeasure Actions
- 2) Countermeasure Expenditures
- 3) Battle Losses

| <p>INPUT</p> <p>1) System configuration criteria</p> <p>2) Recovery and reconstitution priorities</p> <p>3) Operational requirements</p> <p>4) Range safety requirements</p> <p>5) Situation data</p> <p>6) Environment conditions</p> <p>7) Deployment handover data and information</p> | <p>F46 - MAINTAIN SYSTEM CAPABILITY</p> <p>Description: This high level function encompasses the processes and means to maintain the capability of the SDS to meet its mission requirements. The function includes managing the system operational configuration, reconstituting the system, maintaining and supporting the system, and providing launch assets.</p> <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F46-1</td><td>New and reconstitution resources</td></tr><tr><td>F46-2</td><td>Management and operation and maintenance resources</td></tr><tr><td>F46-3</td><td>Launch resources</td></tr></table> | # | <u>Requirement Description</u> | F46-1 | New and reconstitution resources | F46-2 | Management and operation and maintenance resources | F46-3 | Launch resources | <p>OUTPUT</p> <p>1) System configuration (including the resources to support other functions)</p> <p>2) System status data</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|-------|----------------------------------|-------|----------------------------------------------------|-------|------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | | | | | |
| F46-1 | New and reconstitution resources | | | | | | | | | |
| F46-2 | Management and operation and maintenance resources | | | | | | | | | |
| F46-3 | Launch resources | | | | | | | | | |

INPUT

- 1) System Configuration Criteria
- 2) Recovery Priorities
- 3) Situation Data
- 4) Reconstituted Capabilities
- 5) Launch Reports And Launched Assets
- 6) Environment Conditions

F461 - MANAGE SYSTEM OPERATIONAL CONFIGURATION

Description: This function encompasses the processes and means to maintain a preferred configuration of operational SDS assets in accordance with system configuration criteria and recovery priorities. The function includes managing the space/time distribution of system assets, activating and deactivating reserve assets, providing communication connectivity and service, and obtaining and dissemination system operational status data.

Requirement Description

- | | |
|--------|------------------------------------|
| F461-1 | Management And Operation Resources |
| F461-2 | Host Facilities And/Or Platforms |

OUTPUT

- 1) System Configuration
- 2) System Status Data

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div><div>1) System Configuration Criteria</div><div>2) Recovery Priorities</div><div>3) Situation Data</div><div>4) System Status Data</div><div>5) Activated And Deactivated Reserve Assets</div><div>6) Reconstituted Capabilities</div><div>7) Launch Reports And Launched Assets</div></div></div> | <div>F4611 - MANAGE SPACE/TIME DISTRIBUTION OF SYSTEM ASSETS</div> <div><div>Description: This function encompasses the processes and means to maintain a preferred space/time distribution of operational system assets in accordance with system configuration criteria and system recovery priorities. The function involves implementing normal configuration changes, identifying deficiencies of current asset distributions, defining options to improve the distribution, selecting and planning redistributions of assets, tasking specific redistribution actions, and executing the redistribution taskings.</div><div><div>#</div><div>Requirement Description</div><div>F4611-1</div><div>Management And Operations Resources</div><div>F4611-2</div><div>Host Facilities And/Or Platforms</div></div></div> | <div>OUTPUT</div> <div><div>1) Preferred Distribution Of Operational System Assets</div></div> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|

INPUT

- 1) System Configuration Criteria
- 2) Recovery Priorities
- 3) Preferred Distribution Of System Assets
- 4) System Status Data

F4612 - ACTIVATE AND DEACTIVATE RESERVE ASSETS

Description: This function encompasses the processes and means to activate and deactivate reserve system assets to enhance the pool of operational assets or to preserve the pool of reserve assets, as the distribution of assets, the system configuration criteria, and the recovery priorities dictate. The function involves determining or receiving requirements for activation/deactivation of reserve assets, identifying the applicable procedure, executing the asset activation or deactivation, and handing over activated assets to the space/time distribution management function.

| # | Requirement Description |
|---------|------------------------------------|
| F4612-1 | Management And Operation Resources |
| F4612-2 | Host Facilities |

OUTPUT

- 1) Activated Reserve Assets
- 2) Deactivated Reserve Assets

INPUT

- 1) Environmental Conditions
- 2) Activated/Deactivated Assets
- 3) Preferred Asset Distribution
- 4) Systems Status Data
- 5) User Messages
- 6) Communication Resources
- 7) System Configuration Criteria

F4613 - PROVIDE COMMUNICATIONS CONNECTIVITY & SERVICES

Description: This function provides the capability to install, test and maintain communications links between SDS elements. The communication system continuously monitors its links and equipment and will maintain realtime system connectivity. Congestion control is provided through alternate routing schemes and the security functions such as encryption/decryption and message authentication will be implemented. The basic function is to deliver error-free messages in a timely manner to other elements.

Requirement Description

- F4613-1 System And Environment Monitoring
- F4613-2 Network Control
- F4613-3 Data Transport
- F4613-4 Message Routing And Link Congestion Control
- F4613-5 System Security

OUTPUT

- 1) Communications Service And Status
- 2) Messages

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Environmental Conditions</div><div>2) Communications Monitoring And Environment Resources</div><div>3) Communications System Configuration</div></div> | <div>F46131 - PERFORM SYSTEM AND ENVIRONMENT MONITORING</div> <div><div>Description: This process collects data on node locations, link performance, threat activities and the communications environment. The data is analyzed to determine link and channel effectiveness and to determine potential threats. Additional processing provides measures of link degradation as well as location, type and priority of threats to the communications system.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F46131-1</div><div>Status Information Communication Resource</div></div><div><div>F46131-2</div><div>Communication Link And Channel Performance</div></div><div><div>F46131-3</div><div>Communications Threat Situation</div></div></div> | <div>OUTPUT</div> <div><div>1) Congested Links</div><div>2) Unnegated Threat</div><div>3) Degraded Links/Channels</div><div>4) Communication Status Requests</div></div> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

INPUT

- 1) Environmental Conditions
- 2) Communication Status
- 3) Communications Monitoring And Environment Resources
- 4) Communications System Configuration

F461311 - COLLECT INFORMATION

Description: This process collects communication resource status information in order to develop and update a communications status File (to include link status and node status) and a Configuration File (including node locations). This status is fused with reports from external systems in order to discern threats to communication functions and resources.

Requirements Description

- | | |
|-----------|--------------------------------|
| F461311-1 | Link Event Counts |
| F461311-2 | Node Location Lists |
| F461311-3 | NUDET And Jamming Interference |
| F461311-4 | Link Statistics |
| F461311-5 | Threat Summary Report |

OUTPUT

- 1) Communications Status Requests
- 2) Questionable Link Status
- 3) Potential Communication Threats

INPUT

- 1) Communications Monitoring And Environment Resources
- 2) Questionable Link Status
- 3) Communication System Configuration

F461312 - EVALUATE COMMUNICATION PERFORMANCE

Description: This function analyzes traffic statistics from the current and previous control and monitor cycles to produce performance summaries by link and by channel (data interface).

| # | Requirement Description |
|---|-------------------------|
|---|-------------------------|

| | |
|-----------|-----------------------|
| F461312-1 | Link Throughput |
| F461312-2 | Link Integrity |
| F461312-3 | Link Effectiveness |
| F461312-4 | Channel Effectiveness |

OUTPUT

- 1) Link And Channel Degradation
- 2) Communication Status

| <p style="text-align: center;">INPUT</p> <ol style="list-style-type: none"> 1) Potential Communication Threats 2) Communications Monitoring And Environment Resources 3) Link And Channel Degradation 4) Communication System Configuration | <p style="text-align: center;">F461313 - ASSESS COMMUNICATION SITUATION</p> <p>Description: This process fuses information from various other C&M communication processes in order to discern the most disruptive threats to communication functions and resources.</p> <table> <thead> <tr> <th>#</th><th><u>Requirement</u></th><th><u>Description</u></th></tr> </thead> <tbody> <tr> <td>F461313-1</td><td>Link Degradations</td><td></td></tr> <tr> <td>F461313-2</td><td>Active Threat Identification</td><td></td></tr> <tr> <td>F461313-3</td><td>Threat Prioritization</td><td></td></tr> </tbody> </table> | # | <u>Requirement</u> | <u>Description</u> | F461313-1 | Link Degradations | | F461313-2 | Active Threat Identification | | F461313-3 | Threat Prioritization | | <p style="text-align: center;">OUTPUT</p> <ol style="list-style-type: none"> 1) Congested Links 2) Degraded Links/Channels 3) Unnegated Threats |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|-----------|-------------------|--|-----------|------------------------------|--|-----------|-----------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| # | <u>Requirement</u> | <u>Description</u> | | | | | | | | | | | | |
| F461313-1 | Link Degradations | | | | | | | | | | | | | |
| F461313-2 | Active Threat Identification | | | | | | | | | | | | | |
| F461313-3 | Threat Prioritization | | | | | | | | | | | | | |

INPUT

- 1) Preferred Asset Distribution
- 2) Activated/Deactivated Assets
- 3) Control Network Resources
- 4) H/W And S/W Change Requests
- 5) System Status Data
- 6) Degraded Links/Channels
- 7) Routing Tables
- 8) System Reconfiguration Criteria
- 9) Recovery Priorities

F46132 - CONTROL NETWORK

Description: This function provides physical control of the communications system. Configuration/reconfiguration and reconstitution of physical resources will be accomplished. System, subsystem, link and component test and evaluation will be accomplished in this function. Media control for radio, laser and landline links is directed by this function. The process maintains the hardware and software configuration and will control the implementation of new communications functions into the system.

Requirement Description

F46132-1 Network Configuration And Reconstitution

F46132-2 H/W And S/W Configuration

F46132-3 Media Control

F46132-4 Technical Control

OUTPUT

- 1) Communication System Configuration
- 2) Status Reports And Maintenance Requests
- 3) Test Messages

| <div>INPUT</div> <div><div><div>1) Degraded Links/Channels</div><div>2) Routing Tables</div><div>3) System Reconfiguration Criteria</div><div>4) Recovery Priorities</div><div>5) Reconfiguration Recommendation</div><div>6) Preferred Asset Distribution</div><div>7) Activated/Deactivated Assets</div><div>8) Configuration And Reconstitution Resources</div></div></div> | <div>F461321 - DETERMINE CONFIGURATION/RECONFIGURATION & RECONSTITUTION REQUIREMENTS</div> <div><div>Description: Reconfigures subnetworks periodically to accommodate space-based platform motions or when triggered by F46131. Determines actions to take to restore SDS communications after attack or another event causing loss of assets.</div><table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F461321-1</td><td>Acquire And Release Links</td></tr><tr><td>F461321-2</td><td>Network Optimization</td></tr><tr><td>F461321-3</td><td>Network Routing Map And Configuration Distribution</td></tr><tr><td>F461321-4</td><td>Link Event History</td></tr><tr><td>F461321-5</td><td>Network Reconstitution</td></tr></tbody></table></div> | # | Requirement Description | F461321-1 | Acquire And Release Links | F461321-2 | Network Optimization | F461321-3 | Network Routing Map And Configuration Distribution | F461321-4 | Link Event History | F461321-5 | Network Reconstitution | <div>OUTPUT</div> <div><div>1) Communication System Configuration</div></div> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|-----------|---------------------------|-----------|----------------------|-----------|----------------------------------------------------|-----------|--------------------|-----------|------------------------|-------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | | | | | |
| F461321-1 | Acquire And Release Links | | | | | | | | | | | | | |
| F461321-2 | Network Optimization | | | | | | | | | | | | | |
| F461321-3 | Network Routing Map And Configuration Distribution | | | | | | | | | | | | | |
| F461321-4 | Link Event History | | | | | | | | | | | | | |
| F461321-5 | Network Reconstitution | | | | | | | | | | | | | |

| <div>INPUT</div> <div>1) Routing Tables 2) H/W And S/W Change Requests 3) Maintenance Actions 4) H/W And S/W Configuration Resources</div> | <div>F461322 - MANAGE H/W & S/W CONFIGURATION</div> <div>Description: Maintain H/W and S/W configuration database and control the addition of new/modified components.</div> <table><thead><tr><th>#</th><th><u>Requirement Description</u></th></tr></thead><tbody><tr><td>F461322-1</td><td>Network Configuration Change Requirements</td></tr><tr><td>F461322-1</td><td>System Parameters And Database Updates</td></tr><tr><td>F461322-3</td><td>System Software Updates</td></tr><tr><td>F461322-4</td><td>New/Additional System Components</td></tr></tbody></table> | # | <u>Requirement Description</u> | F461322-1 | Network Configuration Change Requirements | F461322-1 | System Parameters And Database Updates | F461322-3 | System Software Updates | F461322-4 | New/Additional System Components | <div>OUTPUT</div> <div>1) Status Reports And Maintenance Requests</div> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|-----------|-------------------------------------------|-----------|----------------------------------------|-----------|-------------------------|-----------|----------------------------------|-------------------------------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | | | | | | | |
| F461322-1 | Network Configuration Change Requirements | | | | | | | | | | | |
| F461322-1 | System Parameters And Database Updates | | | | | | | | | | | |
| F461322-3 | System Software Updates | | | | | | | | | | | |
| F461322-4 | New/Additional System Components | | | | | | | | | | | |

| <div>INPUT</div> <div>1) Routing Tables 2) Communication System Configuration 3) Media Control Resources</div> | <div>F461323 - PROVIDE MEDIA CONTROL</div> <div>Description: Control various types of communications media including radios, lasercom and terrestrial networks including fiber-optic transmission system.</div> <table><thead><tr><th>#</th><th><u>Requirement Description</u></th></tr></thead><tbody><tr><td>F461323-1</td><td>Radio Link Control</td></tr><tr><td>F461323-2</td><td>Laser Link Control</td></tr><tr><td>F461323-3</td><td>Ground Network Control</td></tr></tbody></table> | # | <u>Requirement Description</u> | F461323-1 | Radio Link Control | F461323-2 | Laser Link Control | F461323-3 | Ground Network Control | <div>OUTPUT</div> <div>1) Revised Media Control</div> |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|-----------|--------------------|-----------|--------------------|-----------|------------------------|-------------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | | | | | |
| F461323-1 | Radio Link Control | | | | | | | | | |
| F461323-2 | Laser Link Control | | | | | | | | | |
| F461323-3 | Ground Network Control | | | | | | | | | |

INPUT

- 1) System Reconfiguration Criteria
- 2) Routing Tables
- 3) Revised Media Control
- 4) Communication System Configuration
- 5) System Status Data
- 6) Technical Control Resources

F461324 - CONDUCT TECHNICAL CONTROL

Description: Provides system level tests on channels and links in addition to detailed fault detection, isolation and repair/replacement at the component level.

Requirement Description

- | | |
|-----------|-----------------------------------|
| F461324-1 | System Tests |
| F461324-2 | Fault Detection |
| F461324-3 | Fault Correction |
| F461324-4 | Patch Around Or Repair Components |

OUTPUT

- 1) Reconfiguration Recommendation
- 2) Test Messages
- 3) Maintenance Actions

| <div>INPUT</div> <div><div>1) User Messages</div><div>2) Test Messages</div><div>3) Messages From Security</div><div>4) Data Transport Resources</div><div>5) System Configuration Criteria</div></div> | <div>F46133 - PERFORM DATA TRANSPORT</div> <div><div>Description: This function implements the transmission and receipt of messages with all their associated OSI protocols. Receipt of and delivery of messages to the communications system and external users is controlled by the function.</div><table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F46133-1</td><td>User Messages</td></tr><tr><td>F46133-2</td><td>Communication System Messages</td></tr><tr><td>F46133-3</td><td>Message Creation And Transmission</td></tr><tr><td>F46133-4</td><td>Message Receipt And Breakdown</td></tr></tbody></table></div> | # | Requirement Description | F46133-1 | User Messages | F46133-2 | Communication System Messages | F46133-3 | Message Creation And Transmission | F46133-4 | Message Receipt And Breakdown | <div>OUTPUT</div> <div><div>1) Messages</div><div>2) Messages For Security</div></div> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|----------|---------------|----------|-------------------------------|----------|-----------------------------------|----------|-------------------------------|----------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | | | |
| F46133-1 | User Messages | | | | | | | | | | | |
| F46133-2 | Communication System Messages | | | | | | | | | | | |
| F46133-3 | Message Creation And Transmission | | | | | | | | | | | |
| F46133-4 | Message Receipt And Breakdown | | | | | | | | | | | |

INPUT

- 1) Clear Messages
- 2) Messages With Authorization Added
- 3) Message Authentication
- 4) Decrypt Received Messages
- 5) User Message Resources
- 6) System Configuration Criteria

F461331 - PROCESS USER MESSAGES

Description: Validate user connectivity and provide initial message processing before/after protocol operations.

| # | <u>Requirement Description</u> |
|-----------|----------------------------------------|
| F461331-1 | Protocol Service For Transmissions |
| F461331-2 | Outgoing Message Validation |
| F461331-3 | Protocol Service For Received Messages |
| F461331-4 | Received Message Validation |

OUTPUT

- 1) Messages
- 2) Transmitted User Messages

| <div>INPUT</div> <div>1) Test Messages 2) System Message Resources 3) System Configuration Criteria</div> | <div>F461332 - PROCESS COMMUNICATION SYSTEM MESSAGES</div> <div>Description: This function generates messages and responses to maintain the status of the communications system.</div> <div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F461332-1</td><td>Network Control Orders</td></tr><tr><td>F461332-2</td><td>Communication Function Information</td></tr></table></div> | # | Requirement Description | F461332-1 | Network Control Orders | F461332-2 | Communication Function Information | <div>OUTPUT</div> <div>1) Transmitted Communication Messages</div> |
|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|-----------|------------------------|-----------|------------------------------------|--------------------------------------------------------------------|
| # | Requirement Description | | | | | | | |
| F461332-1 | Network Control Orders | | | | | | | |
| F461332-2 | Communication Function Information | | | | | | | |

| <p>INPUT</p> <p>1) Transmitted Communication Messages</p> <p>2) Transmitted User Messages</p> <p>3) Transmitted Encrypted Message</p> <p>4) Build Message Resources</p> <p>5) System Configuration Criteria</p> | <p>F461333 - BUILD/TRANSMIT MESSAGE</p> <p>Description: Perform the transmit functions for the IOS/OSI Reference model level protocols.</p> <table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F461333-1</td><td>Protocol Applications</td></tr><tr><td>F461333-2</td><td>Internet Protocol</td></tr><tr><td>F461333-3</td><td>Network Protocol And Message Transmission</td></tr></table> | # | Requirement Description | F461333-1 | Protocol Applications | F461333-2 | Internet Protocol | F461333-3 | Network Protocol And Message Transmission | <p>OUTPUT</p> <p>1) Messages</p> <p>2) Cleared Messages For Encryption</p> <p>3) Messages For Authentication</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|-----------|-----------------------|-----------|-------------------|-----------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | |
| F461333-1 | Protocol Applications | | | | | | | | | |
| F461333-2 | Internet Protocol | | | | | | | | | |
| F461333-3 | Network Protocol And Message Transmission | | | | | | | | | |

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Received Encrypted Messages</div><div>2) Unbuild Message Resources</div><div>3) System Configuration Criteria</div></div> | <div>F461334 - RECEIVE/UNBUILD MESSAGE</div> <div><div>Description: Perform the received functions for the ISO/OSI Reference Model level protocols.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F461334-1</div><div>Message Reception And Network Protocol</div></div><div><div>F461334-2</div><div>Internet Protocol</div></div><div><div>F461334-3</div><div>Application Protocol</div></div></div> | <div>OUTPUT</div> <div><div>1) Received Encrypted Message</div><div>2) Messages Received With Authentication</div></div> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|

INPUT

- 1) System Configuration Criteria
- 2) System Status Reports
- 3) Routing And Congestion Control Resources
- 4) Congested Links
- 5) Communication System Configuration

F46134 - PROVIDE ROUTING & CONGESTION CONTROL

Description: This function provides the logical control to partition data, monitor data flow, control congestion, assign channels and provide alternate routing schemes.

| # | Requirement Description |
|----------|------------------------------------------------|
| F46134-1 | Communication System Partitioning Requirements |
| F46134-2 | Traffic Flow Control |
| F46134-3 | Traffic Congestion Control |
| F46134-4 | Channel Assignments |
| F46134-5 | Routing Table Updates |

OUTPUT

- 1) Routing Tables

| <div>INPUT</div> <div>1) System Configuration Criteria 2) System Status Reports 3) Communication Partitioning Resources</div> | <div>F461341 - DETERMINE PARTITIONING REQUIREMENTS</div> <div>Description: Determine how to partition the system so sensor data may be routed to the appropriate platforms.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F461341-1</td><td>Network Configuration</td></tr><tr><td>F461341-2</td><td>Sensor Data Destinations</td></tr><tr><td>F461341-3</td><td>Network Connectivity</td></tr></tbody></table> | # | Requirement Description | F461341-1 | Network Configuration | F461341-2 | Sensor Data Destinations | F461341-3 | Network Connectivity | <div>OUTPUT</div> <div>1) Valid Routes</div> |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|-----------|-----------------------|-----------|--------------------------|-----------|----------------------|----------------------------------------------|
| # | Requirement Description | | | | | | | | | |
| F461341-1 | Network Configuration | | | | | | | | | |
| F461341-2 | Sensor Data Destinations | | | | | | | | | |
| F461341-3 | Network Connectivity | | | | | | | | | |

INPUT

- 1) Congested Links
- 2) System Status Reports
- 3) Routing And Congestion Control Resources

F461342 - MONITOR FLOW CONTROL

Description: Continuously monitor the status of traffic flow throughout the system and determine whether it is within predefined bounds.

| # | Requirement Description |
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| | |
|-----------|-----------------|
| F461342-1 | Network Traffic |
|-----------|-----------------|

| | |
|-----------|-----------------------|
| F461342-2 | Network Configuration |
|-----------|-----------------------|

| | |
|-----------|-------------------------|
| F461342-3 | Flow Control Monitoring |
|-----------|-------------------------|

OUTPUT

- 1) Affected Channels/Links

| | | |
|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <div>INPUT</div> <div>1) System Configuration Criteria 2) Channel Changes 3) Channel Resources</div> | <div>F461344 - ASSIGN CHANNELS</div> <div>Description: Assigns channels on a platform basis. May change assignments based on either fault detection or to relieve congestion.</div> <div><div>#</div><div>Requirement Description</div><div>F461344-1 Valid Routes</div><div>F461344-2 Jamming And Nuclear Environment Threat</div><div>F461344-3 Message Priority</div></div> | <div>OUTPUT</div> <div>1) New Routes</div> |
|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|

INPUT

- 1) New Routes
- 2) Updating Resources

F461345 - UPDATE ROUTING TABLES

Description: Updates the routing tables used to translate from logical addresses to physical links. Routing considers traffic capacity of each link, whether it is a primary or secondary link, geometries of space elements and fault conditions.

| # | <u>Requirement Description</u> |
|---|--------------------------------|
|---|--------------------------------|

| | |
|-----------|-----------------------|
| F461345-1 | Network Configuration |
|-----------|-----------------------|

| | |
|-----------|------------------|
| F461345-2 | Link/Node Status |
|-----------|------------------|

| | |
|-----------|-----------------------------------------|
| F461345-3 | Jamming And Nuclear Threat Environments |
|-----------|-----------------------------------------|

OUTPUT

- 1) Routing Tables

| <div>INPUT</div> <div><div>1) Messages For Security</div><div>2) OPSEC Guidance</div><div>3) Security Resources</div><div>4) System Configuration Criteria</div></div> | <div>F46135 - PROVIDE COMMUNICATIONSSECURITY</div> <div><div>Description: This function provides the communications security features. Specific functions include cryptographic key storage and distribution, encryption/decryption, OPSEC procedures and authentication techniques for message validation.</div><div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F46135-1</td><td>Message Information Collection</td></tr><tr><td>F46135-2</td><td>Communications OPSEC Guidelines</td></tr><tr><td>F46135-3</td><td>Message Authentication</td></tr></table></div></div> | # | Requirement Description | F46135-1 | Message Information Collection | F46135-2 | Communications OPSEC Guidelines | F46135-3 | Message Authentication | <div>OUTPUT</div> <div><div>1) Communication Status Requests</div><div>2) Communications OPSEC Policies And Procedures</div></div> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|----------|--------------------------------|----------|---------------------------------|----------|------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | |
| F46135-1 | Message Information Collection | | | | | | | | | |
| F46135-2 | Communications OPSEC Guidelines | | | | | | | | | |
| F46135-3 | Message Authentication | | | | | | | | | |

INPUT

- 1) Clear Messages For Encryption
- 2) Encrypted Messages Received
- 3) Cryptography Resources
- 4) System Configuration Criteria

F461351 - PROVIDE CRYPTOGRAPHY

Description: Performs end-to-end encryption/decryption and the key distribution functions

| # | <u>Requirement Description</u> |
|-----------|--------------------------------|
| F461351-1 | Crypto Key Storage |
| F461351-2 | Remote Crypto Key Change |

OUTPUT

- 1) Decrypted Received Messages
- 2) Transmitted Encrypted Messages

| <p>INPUT</p> <p>1) OPSEC Guidance 2) OPSEC Resources 3) System Configuration Criteria</p> | <p>F461352 - PROVIDE COMMUNICATION OPSEC GUIDELINES</p> <p>Description: This function provides the OPSEC guidelines for conducting SDS operations.</p> <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F461352-1</td><td>OPSEC Guidelines Document</td></tr><tr><td>F461352-2</td><td>OPSEC Procedures</td></tr></table> | # | <u>Requirement Description</u> | F461352-1 | OPSEC Guidelines Document | F461352-2 | OPSEC Procedures | <p>OUTPUT</p> <p>1) Communications OPSEC Policies And Procedures</p> |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|-----------|---------------------------|-----------|------------------|----------------------------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | | | |
| F461352-1 | OPSEC Guidelines Document | | | | | | | |
| F461352-2 | OPSEC Procedures | | | | | | | |

INPUT

- 1) Messages With Authentication
- 2) Messages For Authentication
- 3) Authentication Resources
- 4) System Configuration Criteria

F461353 - AUTHENTICATE MESSAGES

Description: This function deals with all activities associated with the authentication of incoming and outgoing messages.

| # | Requirement Description |
|-----------|--------------------------------------------|
| F461353-1 | Authentication Scheme For Message Encoding |
| F461353-2 | Authentication Scheme For Message Decoding |
| F461353-3 | Link Spoofing Threat |

OUTPUT

- 1) Messages With Authentication Added
- 2) Authenticated Messages

| <p>INPUT</p> <p>1) System configuration criteria 2) Distribution of assets 3) Activation and deactivation of reserve assets 4) Communications status</p> | <p>F4614 - OBTAIN AND DISSEMINATE SYSTEM OPERATIONAL STATUS DATA</p> <p>Description: This function encompasses the processes and means to obtain operational status data on SDS assets and to disseminate it to other SDS functions and to external parties. The function involves implementing routine asset status reporting, requesting and providing special asset status reports, providing event-triggered asset status reports, maintaining local and master system status databases, and providing tailored status reports for SDS functions.</p> <table><tr><th><u>#</u></th><th><u>Requirement Description</u></th></tr><tr><td>F4614-1</td><td>Management and operation resources</td></tr><tr><td>F4614-2</td><td>Host facilities and/or platforms</td></tr></table> | <u>#</u> | <u>Requirement Description</u> | F4614-1 | Management and operation resources | F4614-2 | Host facilities and/or platforms | <p>OUTPUT</p> <p>1) System status data</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------|---------|------------------------------------|---------|----------------------------------|---------------------------------------------------|
| <u>#</u> | <u>Requirement Description</u> | | | | | | | |
| F4614-1 | Management and operation resources | | | | | | | |
| F4614-2 | Host facilities and/or platforms | | | | | | | |

INPUT

- 1) Reconstitution priorities
- 2) Situation data
- 3) System configuration
- 4) System status data
- 5) Environment conditions

F462 - RECONSTITUTE SYSTEM

Description: This function encompasses the processes and means to reconstitute the SDS system following losses or exhaustion of assets. Reconstitution refers to the replacement of lost or exhausted assets (including human assets), as opposed to the reallocation of functions or responsibilities among remaining assets. The function includes determining the need for system reconstitution (versus just recovery), determining the availability of reconstitution resources, developing a reconstitution action plan, tasking reconstitution resources, and implementation of the taskings by those resources.

| # | Requirement Description |
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|---|-------------------------|

| | |
|--------|------------------------------------|
| F462-1 | Management and operation resources |
|--------|------------------------------------|

| | |
|--------|-----------------|
| F462-2 | Host facilities |
|--------|-----------------|

| | |
|--------|----------------------------------------------------------------------------|
| F462-3 | Reconstitution resources (personnel, equipment, and delivery capabilities) |
|--------|----------------------------------------------------------------------------|

OUTPUT

- 1) Reconstituted capabilities

| | | |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div>1) Reconstitution priorities</div><div>2) Situation data</div><div>3) System status data</div></div> | <div>F4621 - DETERMINE NEED FOR SYSTEM RECONSTITUTION</div> <div><div>Description: This function encompasses the processes and means to determine the need to reconstitute system assets. It involves review of situation and system status data, evaluation of continuing SDS mission demands, assessment of shortfalls expected to remain after system recovery operations, determination that reconstitution is necessary, and definition of specific needs and conditions in accordance with priorities for reconstitution.</div><div><div>#</div><div>Requirement Description</div></div><div><div>F4621-1</div><div>Management operation resources</div></div><div><div>F4621-2</div><div>Host facilities</div></div></div> | <div>OUTPUT</div> <div><div>1) Specific reconstitution needs and conditions</div></div> |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|

| | | |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <p>INPUT</p> <p>1) Reconstitution priorities 2) Situation data</p> | <p>F4622 - DETERMINE AVAILABILITY OF RECONSTITUTION RESOURCES</p> <p>Description: This function encompasses the processes and means to ascertain the existence, status, and other commitments against resources which could be used for or in support of SDS system reconstitution. The function involves monitoring system status data (to the extent that the system includes caches of reconstitution resources), conducting inquiries into the availability of external resources which could support SDS reconstitution, and compiling an inventory of relevant available resources</p> <p><u>#</u> <u>Requirement Description</u></p> <p>F4622-1 Management resources</p> <p>F4622-2 Host facilities</p> | <p>OUTPUT</p> <p>1) Inventory of resources available for or in support of SDS reconstitution</p> |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <p>INPUT</p> <ol style="list-style-type: none"> 1) Reconstitution priorities 2) System status data 3) Specific reconstitution needs and conditions 4) Inventory of available reconstitution resources | <p>F4623 - DEVELOP RECONSTITUTION ACTION PLAN</p> <p>Description: This function encompasses the processes and means to formulate and refine a specific plan of action for meeting SDS reconstitution needs with available resources and in accordance with reconstitution priorities. The function involves formulation of the overall reconstitution approach, allocation of available resources to prioritized requirements, definition of tasks and their desired sequences, and detailed allocation of resources to tasks over time</p> <p><u>#</u> <u>Requirement Description</u></p> <p>F4623-1 Management resources</p> <p>F4623-2 Planning and allocation tools</p> <p>F4623-3 Host facilities</p> | <p>OUTPUT</p> <ol style="list-style-type: none"> 1) Reconstitution action plan |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|

INPUT

- 1) Reconstitution action plan

F4624 - TASK RECONSTITUTION RESOURCES

Description: This function encompasses the processes and means to task reconstitution resources to implement the reconstitution action plan. The function involves coordination with the parent organizations of the identified reconstitution resources to establish tasking channels or to transfer their operational control to the SDS, detailed assignment of resources to tasks of the reconstitution plan, and formal communication and acknowledgment of those taskings

| <u>#</u> | <u>Requirement Description</u> |
|----------|--------------------------------|
|----------|--------------------------------|

| | |
|---------|----------------------|
| F4624-1 | Management resources |
|---------|----------------------|

| | |
|---------|-----------------|
| F4624-2 | Host facilities |
|---------|-----------------|

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| F4624-3 | Communications with reconstitution resource parent organizations |
|---------|------------------------------------------------------------------|

OUTPUT

- 1) Specific taskings to reconstitution resources

| <div>INPUT</div> <div>1) Taskings of reconstitution resources</div> | <div>F4625 - IMPLEMENT RECONSTITUTION TASKINGS</div> <div>Description: This function encompasses the processes and means employed by reconstitution resources to implement their respective reconstitution taskings. These include but are not limited to organization of work teams, requisition of tools and equipment, delivery and activation of reconstitution assets, and handover of assets to the SDS operational configuration management function.</div> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4625-1</td><td>Skilled reconstitution personnel</td></tr><tr><td>F4625-2</td><td>Caches or other sources of tools and equipment</td></tr><tr><td>F4625-3</td><td>Reconstitution asset delivery means</td></tr><tr><td>F4625-4</td><td>Reconstitution asset activation means</td></tr></tbody></table> | # | Requirement Description | F4625-1 | Skilled reconstitution personnel | F4625-2 | Caches or other sources of tools and equipment | F4625-3 | Reconstitution asset delivery means | F4625-4 | Reconstitution asset activation means | <div>OUTPUT</div> <div>1) Reconstituted capabilities</div> |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|---------|----------------------------------|---------|------------------------------------------------|---------|-------------------------------------|---------|---------------------------------------|------------------------------------------------------------|
| # | Requirement Description | | | | | | | | | | | |
| F4625-1 | Skilled reconstitution personnel | | | | | | | | | | | |
| F4625-2 | Caches or other sources of tools and equipment | | | | | | | | | | | |
| F4625-3 | Reconstitution asset delivery means | | | | | | | | | | | |
| F4625-4 | Reconstitution asset activation means | | | | | | | | | | | |

INPUT

- 1) Maintenance Support and Guidance
- 2) System Configuration
- 3) SSystem Health and Status
- 4) Reconstituted capabilities
- 5) Environment conditions
- 6) Deployment and handover data and information
- 7) Higher Headquarters Approval
- 8) New and Reconstitution Resources

F463 - MAINTAIN AND SUPPORT SYSTEM

Description: This function encompasses the processes and means to maintain and support the SDS system, including equipment and personnel, in accordance with system configuration criteria and special system and equipment requirements. The function includes determining the system availability, performing maintenance, performing modifications, and supporting the system.

Requirement Description

F463-1 Manage SDS Support Systems

F463-2 Maintain SDS Asset Status

F463-3 Operate SDS Support Systems

F463-4 Perform SDS Maintenance

F463-5 Provide SDS Integrated Logistics Support

OUTPUT

- 1) Management and O&M resources
- 2) Retired equipment
- 3) Procurement Requirements

| <p>INPUT</p> <p>1) Maintenance and Support Policies and guidance</p> <p>2) Support System Schedules</p> <p>3) Syatem Asset Status</p> <p>4) Management Resources</p> | <p>F4631 - MANAGE SDS SUPPORT SYSTEMS</p> <p>Description: This function deals with the management of SDS support systems. It includes the management of the overall SDS maintenance capability, the management of space transportation resources, to include scheduling of launches, and the management of logistics support.</p> <table><tr><th>#</th><th><u>Requirement Description</u></th></tr><tr><td>F4631-1</td><td>Maintenance Capability Management</td></tr><tr><td>F4631-2</td><td>Space transportation Management</td></tr><tr><td>F4631-3</td><td>Logicstic Management</td></tr></table> | # | <u>Requirement Description</u> | F4631-1 | Maintenance Capability Management | F4631-2 | Space transportation Management | F4631-3 | Logicstic Management | <p>OUTPUT</p> <p>1) Support Systems Procedures, Criteria, Directives, and Policy</p> <p>2) Integrated Schedules</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------|---------|-----------------------------------|---------|---------------------------------|---------|----------------------|----------------------------------------------------------------------------------------------------------------------------|
| # | <u>Requirement Description</u> | | | | | | | | | |
| F4631-1 | Maintenance Capability Management | | | | | | | | | |
| F4631-2 | Space transportation Management | | | | | | | | | |
| F4631-3 | Logicstic Management | | | | | | | | | |

| <p>INPUT</p> <p>1) Maintenance and Support Policies and guidance</p> <p>2) Support System Schedules</p> <p>3) Syatem Asset Status</p> <p>4) Management Resources</p> | <p>F4631 - MANAGE SDS SUPPORT SYSTEMS</p> <p>Description: This function deals with the management of SDS support systems. It includes the management of the overall SDS maintenance capability, the management of space transportation resources, to include scheduling of launches, and the management of logistics support.</p> <table><thead><tr><th>#</th><th>Requirement Description</th></tr></thead><tbody><tr><td>F4631-1</td><td>Maintenance Capability Management</td></tr><tr><td>F4631-2</td><td>Space transportation Management</td></tr><tr><td>F4631-3</td><td>Logistic Management</td></tr></tbody></table> | # | Requirement Description | F4631-1 | Maintenance Capability Management | F4631-2 | Space transportation Management | F4631-3 | Logistic Management | <p>OUTPUT</p> <p>1) Support Systems Procedures, Criteria, Directives, and Policy</p> <p>2) Integrated Schedules</p> |
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| # | Requirement Description | | | | | | | | | |
| F4631-1 | Maintenance Capability Management | | | | | | | | | |
| F4631-2 | Space transportation Management | | | | | | | | | |
| F4631-3 | Logistic Management | | | | | | | | | |

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| <div>INPUT</div> <div>1) System Maintainability and Availability Criteria 2) Operational System Asset Status 3) Maintenance Resources</div> | <div>F4632 - MAINTAIN SDS ASSET STATUS</div> <div>Description: This function deals with the maintenance of SDS assets and the determination of system operational status. It includes the task to maintain the system at a specified operational readiness level, the maintenance of a support system to provide personnel and material requirements needed to operate the system, and the logistic and planning capability to insure the system logistics support needs are planned, programmed and acquired.</div> <div><div>#</div><div>Requirement Description</div></div> <div>F4632-1 Maintain Operational Readiness</div> <div>F4632-2 Support SDS Systems</div> <div>F4632-3 Provide Logistics Planning</div> | <div>OUTPUT</div> <div>1) Operational Asset Status</div> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|

INPUT

- 1) Maintenance and Support Criteria
- 2) Integrated Schedules
- 3) H/A Approval to Conduct Space Transportation Operations
- 4) Support Operations Resources
- 5) Support System Health and Status

F4633 - OPERATE SDS SUPPORT SYSTEMS

Description: This function deals with the operations of the maintenance, Support andspace transportation activities. It includes all those activities associated with the operation of a maintenance support function, those dealing with the acquisition and launch of space transportation systems, and the operation of an integrated logistic support function.

| # | Requirement Description |
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| F4633-1 | Maintenance support |
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|---------|------------------------------|
| F4633-2 | Space transportation Support |
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| | |
|---------|-----------------------------|
| F4633-3 | Integrated Logistic Support |
|---------|-----------------------------|

OUTPUT

- 1) System Status

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>INPUT</div> <div><div><div>1) Support System Procedures, criteria, Directives, and Policy Integrated Schedules</div><div>2) System Health and Status Data Maintenance Resources</div><div>3) Higher Headquarters Approval to Conduct Corrective Maintenance</div></div></div> | <div>F4634 - PERFORM SDS MAINTENANCE</div> <div><div>Description: This function encompasses those activities dealing with the performance of maintenance, corrective actions, system upgrades P3I and deferred enhancements and the performance of routine services and maintenance of the system. This function also includes the reconfiguration of SDS assets.</div><div><div><div>#</div><div>Requirement Description</div></div><div><div>F4634-1</div><div>Preventative Maintenance</div></div><div><div>F4634-2</div><div>Corrective Maintenance</div></div><div><div>F4634-3</div><div>System Servicing</div></div><div><div>F4634-4</div><div>System Modifications</div></div><div><div>F4634-2</div><div>Asset Reconfiguration</div></div></div></div> | <div>OUTPUT</div> <div><div><div>1) Maintenance Status</div><div>2) Health and Status Data</div><div>3) Expended Asset Reports</div><div>4) Retired Maintenance Assets</div></div></div> |
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INPUT

- 1) Logistics requirements and support schedules
- 2) Reconstituted capabilities
- 3) Deployment handover data and information
- 4) Logistics requirements
- 5) Integrated schedules
- 6) New resources

F4635 - PROVIDE INTEGRATED LOGISTIC SUPPORT

Description: This function encompasses those activities dealing with the performance of integrated logistics support, planning and resource acquisitions. It includes the development and maintenance of the plans and programs dealing with the logistic support and planning for the SDS. i.e. SEMP, ILSP, PMP, etc.

Requirement Description

F4635-1 Plans and Programs

F4635-2 Policies and Directives

F4635-3 Reviews and Schedules

F4635-4 Requests

OUTPUT

- 1) Procurement requirements
- 2) Logistics resource status
- 3) O&M maintenance resources
- 4) Retired equipment

| <div>INPUT</div> <div><div>1) Operational requirements</div><div>2) Range safety requirements</div><div>3) Launch needs</div><div>4) Launch components, facilities & support equipment</div></div> | <div>F464 - PROVIDE LAUNCH ASSETS</div> <div><div>Description: This function encompasses all those activities associated with the launch of SDS space resources. It covers support as well as operational launches of SDS assets. This function deals with the determination of launch requirements, the requisition of assets, the arrangement for ground and space transportation vehicles and other activities associated with space launches.</div><table><tr><th>#</th><th>Requirement Description</th></tr><tr><td>F464-1</td><td>Launch Requirements</td></tr><tr><td>F464-2</td><td>Inspection and Receiving</td></tr><tr><td>F464-3</td><td>Integration</td></tr><tr><td>F464-4</td><td>Launch</td></tr><tr><td>F464-5</td><td>Refurbishment</td></tr></table></div> | # | Requirement Description | F464-1 | Launch Requirements | F464-2 | Inspection and Receiving | F464-3 | Integration | F464-4 | Launch | F464-5 | Refurbishment | <div>OUTPUT</div> <div><div>1) Launch reports and asset status</div><div>2) Failed components</div></div> |
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| # | Requirement Description | | | | | | | | | | | | | |
| F464-1 | Launch Requirements | | | | | | | | | | | | | |
| F464-2 | Inspection and Receiving | | | | | | | | | | | | | |
| F464-3 | Integration | | | | | | | | | | | | | |
| F464-4 | Launch | | | | | | | | | | | | | |
| F464-5 | Refurbishment | | | | | | | | | | | | | |

INPUT

- 1) Special launch directives
- 2) Standard policy and procedures
- 3) Launch needs
- 4) Operational requirements
- 5) Launch planning resources

F4641 - DETERMINE LAUNCH REQUIREMENTS

Description: This function covers those activities dealing with the determination of launch requirements and those actions to implement those requirements. It covers planning, scheduling and the monitoring of all launch activities both operational and support.

| # | <u>Requirement Description</u> |
|---------|--------------------------------|
| F4641-1 | Requirements Planning |
| F4641-2 | Scheduling |
| F4641-3 | Resource Planning |

OUTPUT

- 1) Required launch configuration and schedules

INPUT

- 1) Required launch configuration and Launch schedules
- 2) Launch components and equipment

F4642 - RECEIVE AND INSPECT LAUNCH COMPONENTS

Description: This function deals with the arrangement for transportation of assets from supply points or from depots to the launch facility complex, the receipt for and the inspection of received components, and the determination if these components meet system specifications prior to delivery to the integration facility.

| # | <u>Requirement Description</u> |
|---------|--------------------------------|
| F4642-1 | Transportation |
| F4642-2 | Inspection |
| F4642-3 | Repair |
| F4642-4 | Security |
| F4642-5 | Test and Evaluation |

OUTPUT

- 1) Component inspection/test results
- 2) Accepted launch components
- 3) Failed components

INPUT

- 1) Required launch configuration and schedules
- 2) Component inspection/test results
- 3) Accepted launch components
- 4) Integration resources

F4643 - INTEGRATE PAYLOAD AND LAUNCH VEHICLE

Description: This function encompasses those activities dealing with the acceptance of the space asset and launch vehicle from the receive and inspection facility, to the test and evaluation of the individual components, through the integration of the different components into a single payload, to their final step of integrating the payload into the launch vehicle.

| # | Requirement Description |
|---------|--------------------------------------|
| F4643-1 | Integration of assets and components |
| F4643-2 | Test and Evaluation |
| F4643-3 | Support facilities and equipment |
| F4643-4 | Transportation |

OUTPUT

- 1) Vehicle specifications
- 2) Integrated launch vehicle

INPUT

- 1) Range safety requirements and operational requirements
- 2) Required launch configuration and schedules
- 3) Vehicle specifications
- 4) Integrated launch vehicle
- 5) Launch resources

F4644 - CONDUCT LAUNCH OPERATIONS

Description: This function deals with those activities commencing with the completion of the payload and launch vehicle mating through the final on-orbit checkout of the launched asset to the turn over of the asset to the SDS-OC.

| # | <u>Requirement Description</u> |
|---------|--------------------------------|
| F4644-1 | Launch Facilities |
| F4644-2 | Launch Control |
| F4644-3 | Ground Control |
| F4644-4 | Ground Support Equipment |

OUTPUT

- 1) Status and reports
- 2) Launched assets

INPUT

- 1) Range safety requirements and operational requirements
- 2) Status and reports
- 3) Refurbishment resources

F4645 - REFURBISH PAD AND VEHICLE

Description: This function encompasses those activities dealing with the refurbishment of the launch pad and facilities prior to the next scheduled launch to include the integration of the next launch vehicle onto the launch pad/complex.

| # | <u>Requirement Description</u> |
|---------|--------------------------------|
| F4645-1 | Repair and Replacement |
| F4645-2 | Launch Vehicle Integration |
| F4645-3 | Test and Evaluation |

OUTPUT

- 1) Refurbishment reports